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Feasibility of a WPI Project Center in Bar Harbor, Maine

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Abstract

A feasibility study was undertaken to determine the suitability of Bar Harbor, Maine as a project center location for Worcester Polytechnic Institute. Potential projects, sponsors, and housing were researched to obtain a complete picture of the appropriateness of the location for project work. Ranking systems were developed for each category to assist the users of the study in understanding the reasoning behind our results. A suitable number of projects, sponsors, and housing were found at the conclusion of the study.

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List of Abbreviations

WPI – Worcester Polytechnic Institute, the university that the students of the project group attended, and the sponsors of the feasibility project.

IQP – Interactive Qualifying Project, a major project requirement for students of Worcester Polytechnic Institute. The IQP is a project that uses the arts and humanities to integrate science and technology into a community.

MQP – Major Qualifying Project, effectively the senior project of students that attend Worcester Polytechnic Institute.

CoA – College of the Atlantic, the university that provided housing for our project group at Bar Harbor.

MDIBL – Mount Desert Island Biological Laboratory, a for-profit research institution located on Mount Desert Island.

Executive Summary

A feasibility study was undertaken to determine the suitability of Bar Harbor on Mount Desert Island as a Worcester Polytechnic Institute project center. Throughout the project, various forms of potential projects, sponsors, and housing at Bar Harbor were researched and analyzed.

The project team created a system of rating each potential project researched to determine its suitability for WPI student project work. The three main entities that must benefit from an IQP must be the students working on the project, the university under whose name the project is published, and the area surrounding the project site. The project team broke down these categories into individual metrics important to each category such that each aspect of the project could be rated. For example, a metric under the "site" category was "environment", which was chosen to rate how much benefit, or harm, would be done to the ecosystems surrounding the project site as a result of the project work. These metrics were weighted subjectively to how important they are for an IQP, and a total rating of each project was established.

Sponsorship of an IQP can be an important aspect to the optimal conclusion of a project. A wide range of entities are capable of providing sponsorship, and different types of sponsors may be targeted based upon the ideal sponsor for a specific IQP. The project team researched many organizations on Mount Desert Island and categorized each one. One example category recorded the sponsor's status as a non-profit organization or not. Projects that require more outside expertise to accomplish are often times better suited to be sponsored by a non-profit organization, while projects that need equipment and monetary supplement will often be sponsored by corporations. No sponsor was given any kind of scoring for two reasons. First, the project team did not have access to the information necessary to perform a ranking of many potential sponsors. Second, assigning scores to sponsors can easily make them feel that they are being judged and may cause some sponsors to ignore requests from WPI.

Students at the Bar Harbor IQP center require housing accommodations in order to be capable

of doing project work. The housing ranking system needed to cover certain requirements in to be considered for WPI student use. Additionally, there are certain factors about housing that may cause one housing solution to be superior to another. The team analyzed all of these factors and created a ranking system for student housing at a project center. These requirements cover both purchased property that would be owned by WPI and rented property that is not owned by the university. Research into several housing solutions was conducted and housing options in Bar Harbor were ranked.

Many of the potential projects researched showed promise for future student work. In total, five projects in particular stood out to the project group as distinct possibilities for projects that could be conducted over the next few years after the publication of this paper. Other projects also exist that may be undertaken a few years after the project center's establishment. There also exist an adequate number of sponsors active in Bar Harbor to develop a permanent project center. In total, twelve organizations or corporations were deemed worthy by the project team to categorize and warrant inclusion into our recommended list of sponsors. The sponsors researched cover both for-profit and non-profit sectors, as well as range from only a few employees to hundreds. Only two housing solutions stood out to the project team as possibilities for future years. The College of the Atlantic may provide housing to WPI summer students, and the facilities on campus are very similar to the ones WPI offers for its own campus. The Schoodic Education and Research Center also has the facilities to host students for project work, although they are much further away from the town of Bar Harbor.

The project team concluded that Mount Desert Island can easily become a project center for WPI in the immediate future. The team recommends that proactive action be taken to secure housing for the student groups each year, and the team has cited certain projects and sponsors worthy for the school to focus its attention on.

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1. Introduction

Bar Harbor and Acadia National Park, located on Mount Desert Island in Maine, are popular summer tourist destinations. During the summer of 2012, Worcester Polytechnic Institute sent project groups to the site for the first time. As one of the pilot groups, the feasibility team's objective was to evaluate the area to determine if Bar Harbor would be an appropriate location for a permanent WPI project center. To accomplish this goal, a series of tasks were undertaken to identify the benefits and the potential problems that may come from establishing a permanent project center.

Some of the topics touched upon in the research include in depth analyses of various projects' feasibility, analyses of the available housing accommodations, and an overview of the potential sponsors in the area. Each topic is approached in a systematic fashion in order to streamline the analysis process and eliminate difficulty of comparison. Statistics are provided where necessary, and written reports were provided to explain the given statistics if needed. The design of the Methodology kept in mind the desire to produce a system that can be reused at various locations and modified to accommodate the evolution of the IQP.

In order to establish a permanent site for many years to come, a need to find appropriate housing accommodations exists. This year, the College of the Atlantic had available housing for the project groups. However, housing at the College of the Atlantic is not guaranteed in the coming years, so an alternative housing solution must be found to ensure that future project groups can attend the project center. There are several options to look at, including arrangements with a hotel, finding apartments available for rent, buying a small piece of property, or attempting to create an ongoing collaboration with the College of the Atlantic to establish a semi-permanent housing solution. These solutions were discussed in the Methodology and Results

sections.

Housing logistics aside, more research was needed to ensure that this project site would be capable of lasting through the years. Arguably, even more important than finding a place to live and work on a project site is ensuring there is enough work to be done on site to continue having projects in subsequent years. Therefore, the group needed to find or brainstorm various project ideas that could be worked on by future project site students. There were many potential leads that the team followed, including checking the local news to find problems that WPI students could help solve and talking to the city government and local businesses for ideas. However, the group first needed to determine what project advisors look for in a project to ensure that any project ideas created by the group would actually be relevant to the university. With this in mind, the managers of various other WPI project sites were asked about what they look for in a project. A weighting system was created for each important aspect that a project advisor would desire when evaluating a potential project in Bar Harbor.

Another important aspect of a project is the sponsor or sponsors who guide the students in their work. Sponsors can create permanent workspaces for projects or donate tools for the completion of projects. Projects can be completed without sponsors, but sponsors allow for better advertisement and more complex projects through their aid. For this project, sponsor research was carried out both online and in person at the site. Online research consisted of sponsor data sheets from useful websites, while physical research encompassed visiting the potential sponsor and gathering extra or missing information. The research will then be analyzed through use of graphs and personal responses, which gave scores and overall suggestions for the best potential sponsors.

2. Background

2.1. General Bar Harbor Information

Bar Harbor is located on the northeastern shore of Mt. Desert Island, the largest island in Maine. Mt. Desert Island is part of Hancock County, one of sixteen counties in Maine, and has a resident population of ten thousand people. The population lives primarily in a few main towns, which are encompassed or bordered by the forests of Acadia National Park. Acadia covers nearly fifty percent of Mt Desert Island and offers an excellent getaway for people looking for a place to relax and enjoy nature. Often mistaken for the entire Mt. Desert Island area, Bar Harbor is also a popular tourist destination during the summer months, during which the population of this semi-rural town shifts from a modest five thousand two hundred residents to an astounding twenty thousand inhabitants. This intense peak and fall of population causes an estranged form of commerce in Bar Harbor. Some shops only stay open in the summer months to take advantage of the excellent tourism opportunities, but the majority is open year-round to allow for comfortable living in Bar Harbor.

2.1.1. Transportation

Parking in the main part of the town is nearly impossible to find during the summer, so the inhabitants take advantage of a convenient and free shuttle service called The Island Explorer (Downeast Transportation Inc.) This service runs from late June to mid-October and links many of the trails with campgrounds, inns, and dining locations throughout Bar Harbor. A different bus service, The Down East, runs year-round and extends from Bar Harbor to Bangor. This cheap and efficient service only costs one dollar per day within one town. Many people also choose to

avoid vehicles and simply rent bicycles in order to travel the greater than two hundred fifty miles of hiking and biking trails Mt. Desert Island has to offer. These trails extend through much of Acadia National Park and all around Mt. Desert Island, offering countless scenic routes to any nearby destination.

2.1.2. Acadia National Park

Acadia National Park is one of the largest tourist-attractions Bar Harbor has to offer. Aside from over one hundred miles of scenic bike trails, Acadia offers wildlife tours and overnight camping or hiking trips (National Park Service, 2012). Whether someone is looking to climb a mountain or just relax by a campfire and enjoy the rich history and culture of Bar Harbor, Acadia will always have something in store to offer. Aside from the park itself, there are many groups that offer assistance to Acadia in order to maintain its natural aspects. One group in particular, Friends of Acadia, serves as the Park's main proponent in conserving the wildlife and natural features (Friends of Acadia, 2011). Friends of Acadia focuses on the aspects of Acadia that the government cannot completely protect or advertise, like maintaining trails and promoting awareness of the fragile ecosystem the area encompasses (Friends of Acadia, 2011).

2.1.3. Educational Institutions

Mt. Desert Island is home to many commercial organizations, educational institutions, and new sustainability programs. One particular educational institution is the College of the Atlantic (CoA), where the WPI students will be living during the pilot summer program. The CoA supports an extensive liberal arts education with its general one encompassing major: human ecology. Near the CoA's campus is the Jackson Laboratory, a leading genetics research facility that offers students with an interest in fields relating to biology excellent tools for

research (The Jackson Laboratory, 2012). Along with the CoA is the Mount Desert Island Biological Laboratory (MDIBL), a private, nonprofit biological research and education institution (MDIBL, 2009). Both institutions have excellent educational and environmental opportunities.

2.2. *Project Sponsors*

The demographic of sponsors can range from a single person to a multibillion-dollar company. In order to be considered a sponsor, one must give either financial support to a certain group, a Project Liaison to guide the students, and/or workspace to carry out the project (Worcester Polytechnic Institute, 2011). Some examples of potential sponsors could include L.L. Bean, Google, The Schoodic Education and Research Center, Microsoft Corporation, and Friends of Acadia. Each of these sponsors has donated a vast amount of money to support research and common goals among communities all around the world. Even though large companies are almost exclusively the only entities thought of as sponsors, some individuals also offer sponsorships to smaller commercial enterprises, including many university-related projects.

Over the past forty years, Worcester Polytechnic Institute students have completed thousands of projects relating to either research of current issues or developing solutions for those issues. Sponsors have aided in the success of many of these projects by providing financial aid to the students participating or by offering suggestions to improve the project. Sponsors for future projects in Bar Harbor, like others from past WPI projects, must meet specific guidelines, which are outlined in the Bar Harbor IQP website (Worcester Polytechnic Institute, 2012).

2.3. Projects

Many project considerations arise from specific locations within Mt. Desert Island, like

Bar Harbor, Northeast Harbor, Southwest Harbor, and Tremont. While Bar Harbor offers tourism-related projects, Tremont may offer an environmentally focused projects involving Bass Harbor or Acadia National Park. Mt. Desert Island has a range of locations from extreme resort scenery to the wilderness. Some projects in the more rural parts of the island may include improving or sustaining Acadia National Park, which certainly supports the tourism economy. Other projects specifically related to tourism may include mapping the coastline or bike trails, which would give tourists the convenience of knowing what to expect when traveling along these locations.

Potential projects will be given a numerical ranking in order to compare them amongst each other and determine the most likely and successful projects. Other similar ranking systems break down a topic into specific categories and score them. This method allow for simple and quick comparison of raw scores. Along with the numerical ranking is a personal analysis of the data, which is extremely important when considering a project. This analysis is made in an objective manner, in which the ranker will provide opinions regarding the success of a project. The success of the project may be related to any of the categories, giving an overall suggestion about the project. For example, one project may be extremely beneficial for the site's reputation but will not provide the students working on the project a proper education. Therefore, based on the subjective evidence, the project may not apply for certain students. Another example could be a beneficial project for the site, student, and university; however, the cost may be too high, meaning the project itself may not be feasible to initiate.

Researching current events in Bar Harbor may yield additional project ideas that the students may undertake. Additional sources of ideas include talking to the local businesses, conversing with the local government, and traveling around Acadia National Park in order to

observe the landscape. The primary focus of any potential project idea should be to benefit Bar Harbor in a meaningful way.

2.3.1.1. Project Centers

WPI already has many project centers situated around the globe. Project centers can exist in one of two forms: an IQP center, or an MQP center. An IQP center hosts projects that focus on the goal of the IQP program, namely to bring science and technology into society using the arts and humanities. An MQP project center focuses on hosting projects that are strictly related to a student's major area of study. These centers offer a way for students to earn academic credit from WPI from scenic areas of interest outside of campus.

Other projects focused on determining the future likelihood of establishing a permanent center in a specific area. These projects closely mirror the overall goal of this project, which is to determine the feasibility of establishing a permanent project center in Bar Harbor. One useful project in particular was completed in Venice, Italy..

2.3.1.1.1. Venice

Many IQPs focus on gathering long-term data about certain aspects of project centers. The Venice project site is an excellent example of many years' worth of interesting data gathered for public benefit. Some examples include:

- Mapping turbulence in the canals of Venice
- Cruise control – Cruise Ships influencing the City of Venice
- Museo Arzanà – preserving the traditional boats of Venice
- Public art preservation in Venice: non-public wellheads and fountains
- Planning sustainable tourism for the northern lagoon park of Venice
- Estimation of excursionist tourists in the city of Venice

- The Noises of Venice – An exploration of noise in a historic city
- Traversing the labyrinth – a comprehensive analysis of pedestrian traffic in Venice

Each example analyzes specific issues or unique information in the city of Venice. Many of these projects will serve as a template for future projects in Bar Harbor because Venice suffers from many similar problems. Similarly to the island of Venice, Bar Harbor is located on a small island severely affected by tourism, and many project developments will attempt to mediate direct issues associated with extreme tourism. Projects will not be limited to these areas, but the majority will concentrate on preserving the natural history of Bar Harbor through the beneficial introduction of technology.

2.4. Ranking Systems

Ranking systems are essential to providing a comparison of a collection of data, can accommodate a variety of methods of assessments in a single system, and once established, can make systematic evaluations. Ranking systems exist to evaluate information that can be quantified, even subjective material, in an objective way. For this reason, a ranking system will be used to analyze potential projects, potential future housing, and potential sponsors.

The ranking system will allow swift evaluations and enable the evaluator to seek out more information on the topic. Our ranking system aims to apply objective values to properties that are often seen as subjective; therefore, the ranking system cannot be used as an objective evaluation of a potential sponsor/housing opportunity/project. This method enables rapid assessment of each subject, and for a better idea of why a particular topic scored a specific rank, the evaluator must look further into the subjective analysis.

The Methodology consists of three ranking systems, including project rankings, housing rankings, and sponsor rankings. The project rankings use a variety of weighted criteria to give a

three part score with three subsections and an overall score. The housing ranking uses a system similar to the project ranking but aims to provide relevant information more quickly for advisers seeking housing. The sponsor rankings are considerably less involved and use a pass or fail style of evaluation for establishing a rank.

2.5. Living Accommodations

In order to establish a successful project center, the students are required a place to live on site. Students can expect reasonable housing accommodations from any off campus IQP project center with quality similar to that of WPI campus housing. Types of rooms students may be given on site may vary depending on a given location. Examples include the London Project Center, which uses dormitory style housing accommodations for its students, and the Venice Project Center, which utilizes apartment style housing.

A dormitory style student residence typically hosts many student bedrooms for each floor of the building and shares common bathrooms and a living room. Kitchens may be incorporated into each room if accommodations were provided by the construction of the building. There usually exists only one common area per floor, and residents only have a small common space in their bedroom if their room is designated as a suite. A cleaning service usually takes care of the bathrooms and all common areas. This option is generally the housing solution that comes at the lowest cost to the students, but the living arrangements are not as comfortable as other solutions.

An apartment style student residence typically puts three to seven students into a single block of space, with two or three students per bedroom. These students share a common area and a kitchen, and both areas are self-maintained. The students are responsible for cleaning all common areas. This housing solution is not as cheap as dormitory-style housing but provides a more independent atmosphere to the students.

A house style residence will transform an entire building into one equivalent floor of a dormitory. Houses usually come with a kitchen area and at least one common area, if not more. Unlike apartments, houses usually have a cleaning service for the common areas and bathrooms. Suite style rooms generally do not exist with this type of housing accommodation. This solution is similar to apartments where a house is not as cheap as a dormitory, but does provide some feeling of independence to the students.

3. Methodology

The goal of this project was to determine the feasibility of establishing a WPI project center on Mount Desert Island, preferably near the town of Bar Harbor. To accomplish this task, a methodology was created such that any evaluations made about potential projects, sponsors, and housing would be based on facts and follow a logical progression.

3.1. Project Outline

Like many other growing towns, Bar Harbor is always advancing either in a technological or business-like fashion. Therefore, many projects begin each year to help the town cope with its ever-changing environment. Many of these projects, like those run by Friends of Acadia and the MDIBL, serve to preserve the natural history of the wildlife and culture of Mt. Desert Island. For this IQP, the Feasibility Group's task was to research and define these possible projects concerning the study and preservation of Bar Harbor. The first step in accomplishing this goal was to develop specific ideas for projects. After developing these ideas, they were ranked according to a certain system the students created. After the ranking, the students provided an opinion-based reaction to each possible project, outlining its major pros and cons. These rankings and suggestions served as a guide to whether or not each project allowed for a successful research opportunity. Suggestions and opinions were offered as to which organizations were able to sponsor future projects in Bar Harbor.

3.2. Project Ranking

3.2.1. Why:

In order to enable expansion of our work, the group devised a systematic approach to the ranking and weighting of potential projects. This approach, however, did not fully express how a project felt; rather, the system quantified a project in criteria determined desirable for projects with respect to the site, the university, and the student. Due to the limitations of the systematic approach, the inclusion of a personal assessment or analysis was included with each project feasibility report.

3.2.2. What:

Each project feasibility report included six sections:

1. An overview of the potential project
2. A statistical analysis overview of the potential project
3. A detailed breakdown of the “site” analysis
4. A detailed breakdown of the “university” analysis
5. A detailed breakdown of the “student” analysis
6. A personal analysis

The potential projects overview included the details of the project, including the stimulus, need, or desire for the project concept, information of the location, and perhaps the type of work that would be done whilst undertaking the project. The statistical analysis of the projects summarized the data provided by the detailed analyses and presented them in a fashion determined appropriate for the given project in a way that highlighted the noteworthy properties of the project. Each detailed breakdown addressed the criteria determined desirable for the given topic and provided a brief statement or explanation of the decided rank, followed by that decided

rank. Due to the subjectivity of the ranking, the interpreter of the data was required to observe the rankings in a scrutinizing manner. The personal analysis provided an interpretation of the data from the human point of view and answered questions such as “Will this project be enjoyable?” or “What sort of image will this portray for the university?”. Answers to these questions enabled the ranker to qualify the data.

3.2.3. How:

The project feasibility report was written in a linear fashion in the following order:

Step One. Collect data about the project for the potential project overview.

Step Two. Go through each criterion, one by one, and determine an explained rank.

Step Three. Generate the statistical report for the ranks established in step two and analyze the ranks and statistical report in order to compare them with the overview.

Step Four. Write a personal report based upon the analysis done in step three.

3.2.3.1. Step One:

Step one involved collecting as much data as possible about the potential project, recording it in an organized fashion and extracting the useful data for the analysis out of the collection. Data collection was an important step for two reasons: having the largest amount of data available to work with made the analysis as accurate as possible, and the possibility of having missed material could be mitigated.

Data collection came in various forms and carried varying levels of detail in the results. The fastest way to find basic information was to use the Internet to find various websites that contained data regarding the project in question. This method was generally the most efficient for ruling out infeasible project ideas due to simple problems. As a theoretical example, a project idea that did its work aboard boats and required a boating company's cooperation for

accomplishment could be immediately ruled out if the company website stated that they went out of business. Being well informed allowed the group to be better prepared when coming into contact with other people, which was a requirement for some other forms of data collection. Also, once the sheer amount of data available was taken into account, the Internet clearly became an indispensable source of information for the project.

Another form of data collection was direct observation. Once a problem was identified, going to the site to witness the problem in person was a powerful tool for judging how much of an impact the problem made for the people in the area. Whereas other sources of information could be extremely biased about the gravity of the problem, being able to see each project problem in person allowed for comparison between the potential problems' values. Accurate accounts of importance allowed for correctly guiding project advisors in the direction that gave the most help to the greatest number of people as possible.

The third method of data collection was to talk to those that were directly affected by the problem. This process was extremely useful for extracting the history of the problem, including when it came into existence and information about any prior work that had been done to help alleviate the problem. Talking with potential project sponsors was another form of data collection. Oftentimes, a sponsor could have readily available ideas for project solutions that they would like to explore, and working with WPI students could help make those solutions a reality.

Of course, all of this data was useless if not stored in an organized and coherent manner. Nothing was more frustrating in data collection than finding data once before and then not being able to find it when needed. Therefore, ensuring that the data was recorded in such a way that it could be found again later was an extremely important task. The collected data for this project

was first filtered by the group to see if it fell into the most important categories. If so, the data could be used to help judge the score for one of the metrics in the project ranking analysis. The data went into the proper section of a project's specific storage file sorted into those categories for later recollection. If the information did not fit into a standard category but could be used for the personal write-up for each potential project, then the data was put in the miscellaneous section of the file instead. This ensured that all relevant information was both stored and could be accessed quickly for use.

3.2.3.2. Step Two:

After analyzing the details of the possible projects in the area, project ideas were broken down and rated by their significance to the "site", the "university", and the "student", which were further broken down into subcategories with rough score. The scores for each subcategory were weighted with respect to their importance to the project idea. When added, they gave each project an overall ranking. Breaking the interpretations down into "site", "university", and "student" allowed for more detailed classification of each project, possibly according to student or university interests.

3.2.3.2.1. Site

For an IQP to be truly successful, the project must yield positive results for all three participating parties. The people living on site must be given some sort of useful information or benefit. The WPI campus must be shown in a good light, and the students themselves must feel that participating in the project was beneficial to them. If one of these requirements is not met, the project will not be viewed as a success by onlookers. With all of these metrics in mind, each category was weighted with regard to how important each one was to the project site. However, these weights may not have been appropriate to every project center because culture and

community values change from location to location. For Bar Harbor, after spending several weeks in its community, a weighted table was created to analyze these metrics. This table can be observed in section 3.2.4 in Figure 3.1.

3.2.3.2.1.1. Current Events

Having work related to current events was a criterion determined to be relevant to the site. In choosing a project that would have long-term benefits, predictions of possible future problems had to be made. Analyzing extensive community issues was usually the best way of finding a project. An important step to the process was ensuring that a group member either visited the site in person or found answers from a resident of the area. Confirmation from an appropriate source that the potential problem found was truly a concern of the community as a whole was a necessary part of the evaluation.

The easiest way to rate a project's impact on the community was to evaluate a community's basic needs and most prominent aspects. For instance, if the problem dealt with education of the community on current events, then the project received a higher score with respect to education. Any similar issues with businesses, the environment, and the government were treated with similar respect. When considering impact on business, topics such as how the project will affect tourism, or cost reductions were addressed. When considering impact on government, topics such as how the project helps to improve efficiency in the town offices or improvements to facilities under government jurisdiction were addressed. When considering the impact on the environment, topics such as whether the project deals directly with bettering the environment or whether the project lessens the town's impact on the environment were also addressed.

3.2.3.2.1.2. Longevity

The longevity of a project was a metric determined relevant to the ranking system due to the necessity for a project site to have a long lasting supply of work for students. A criterion considered for longevity was the potential project's expandability. If the project provides a tangible benefit to the community and can stand on its own, then it could be considered a successful project. However, if it can stand on its own and be expanded later, then more benefits could be provided to the community in future years. Separately from how well a project can be expanded, how well a potential project enables other different projects was also considered in the evaluations for similar reasons. This criterion is different from expandability because enabling other projects involves the creation of new projects. The amount of content presented by a given potential project was also considered a valuable quality of a project in terms of its longevity.

3.2.3.2.1.3. Community Development

The IQP program was designed to bring together technology and the humanities in order to benefit a community in some way. If this goal of advantageous conjunction was not met, then the entire point of the project was lost. Because the persons participating in the project defined the goals, those students could control what results from the project. The project site only had so much influence over the final results. Therefore, a general set of desires that a project site may have in order to aid the selection of a project was developed. This was accomplished by figuring out how well the project would be received by the community.

The last metric for project site ranking involved community development and public services. Projects must serve as some form of benefit for the community in order to prove desirable for the community as a whole. This characteristic would increase the value of the area, which also should have been desired by any project site. Luckily, this metric was easy to rate

because of the simplicity of judging how much a project was tied to any public services. The only difficult analysis was recognizing all forms of public services in order to make sure none were overlooked. For instance, public information in an online resource could be considered a public service because the overall purpose provides information to the community as a whole, much like a town library. The most important piece to remember while rating this metric was to ensure that one kept an open enough mind in order to recognize something as a public service, even if that service were not traditional.

3.2.3.2.2. University

Projects should benefit WPI sufficiently in order to be considered a reasonable opportunity for a future IQP. University importance was broken down into three sections: cost, image, and sustainability. Each of these three sections was then more specifically explained in their own individual subsections. These subsections were given a score and weighted on a scale based on their relative importance to their corresponding section. These weightings summated to give a raw score for the University ranking, as shown in Section 3.2.4 in Figure 3.1.

3.2.3.2.2.1. Cost

Cost was an important factor for any project. For WPI, a potential project had to fall within a reasonable price range while maintaining an adequate educational value and challenge for the students. Along with cost was the university's ability to invest in the project either as a long-term development or as a useful expansion of the school's educational program. Sponsors could support the development of these investments through donations of resources for both the university and students, so research for advantageous sponsors must remain a main focus when creating projects.

3.2.3.2.2.2. Image

Sustainability of a project led to the next metric, which was the university's image created from the outcome of the project. WPI should be concerned with both the humanitarian and cutting edge aspects of each project. An advanced project should benefit the environment, especially in a location like Bar Harbor. Projects did not have to be based off green technology, but they should acknowledge the environmental importance of the location and take into account the effects of every action. Working in Maine required work suitable for maintaining or improving the environment. Either of these approaches would benefit WPI's image in the area, which would assist in extending the acceptance and longevity of each potential project.

3.2.3.2.2.3. Sustainability

With project locations based in Bar Harbor, sustainability was another extremely important metric. WPI recently has focusing more on creating efficient buildings on campus in order to conserve energy and reducing environmental impact. This type of research and technology must have been implemented in each site in order to protect the environment of the project location. Project goals must have taken into account the desires of environmental organizations like Acadia National Park in order to integrate the outcomes completely and properly into the extremely ecological area of Mt. Desert Island. Approximating each project for efficiency and renewability would encourage sponsors to take part in the project, fostering WPI's goal of becoming a more renewable and efficient university.

3.2.3.2.3. Student

Another metric for determining the rank of a potential project was based on the benefit to the student participating. This metric consisted of the following criteria: group dynamics, skill development, and community involvement. The criteria combine to give an overall value of the

Student ranking of a project, as observed in Section 3.2.4 in Figure 3.1

3.2.3.2.3.1. Group Dynamics

The first factor, group dynamics, was important for any project, not just for Bar Harbor. Therefore, certain factors were taken into account as to whether or not the students would be able to work together in the project environment. Some students may not have enjoyed working with certain types of people, while others may have worked very well together. This issue made diversity a reasonable aspect of prospective students for each project. Along with diversity came organization, which was the most important aspect for completing the project both on time and sufficiently.

3.2.3.2.3.2. Community Involvement

Community involvement was the next criterion. A potential project should involve the group in the surrounding community of the project center so that the students could experience new cultural and communal gain. However, this community involvement should maintain student safety at all times, or else the project center as a whole would fail. Student bias and desire to complete the project were some of the most important factors when ranking these projects. The students made the project happen and controlled the outcome of the results, so well suited and enthused students aid in the creation of successful projects. Much consideration of the students' needs and wants in a certain site's location and goals must be made in order to ensure the success of the overall project. To observe the ranking table developed for student, refer to section 3.2.4 in Figure 3.1.

3.2.3.2.3.3. Skill Development and Presence

Specific projects may have called for specific skill sets, and if no student had one or more of those skill sets, then the group dynamics would fail. This situation would require either adaptation by the student to develop those skills or a new student with those abilities to be selected for the project. This criterion was given a score based on the project's possibility to include students of various majors in order to eliminate exclusive selection of major specific students. However, better skills would allow for the creation of a more complex and educational project, and major specific projects may have hindered some students from performing to their full capacity. Students would be able to gather and analyze quality data and report all information in a more intellectual manner if participating in a general encompassing project. The collected data could then be used for future projects both in Bar Harbor and in other IQP locations.

3.2.3.3. Step Three:

Bar graphs were used to analyze the ranks given to each potential project. Each subsection's weighted score contributed to a raw section score, which was weighted amongst each other. The weighted scores were combined to give a total rank for that section, which was plotted in a bar graph. The bar graph contained each section under "site", "university", and "student". These weighted scores added together to form the total score for each "site", "university", and "student" master section. These scores were also plotted in a bar graph for comparison and later investigation. A final score of each project was given by adding the scores of the "site", "university", and "student" sections. These final project scores were placed in a master list organized from high to low, giving an idea as to which project was most likely to succeed in Bar Harbor.

The final score for each project should not have been the final consideration for deciding

on a project. The graphs of the individual master sections gave insight into what each project was geared towards. For example, a project may have scored lowly under the "university" section but highly in the "site" and "student" sections, giving an average score. However, this project may have been proven to be useful in the future. This dilemma was avoided by creating step four, which was the personal interpretation of each project. Also, a total score could be misleading when based on three equal but different master sections. The statistical report gave a suggestion not only for the most likely overall projects but also for which projects were geared specifically for "site", "university", and "student".

3.2.3.4. Step Four:

The authors of this IQP created each ranking system based off research and well-formulated opinions. Therefore, the final rank received for each potential project was biased towards the authors' ideas. In order to avoid bias, an explanation for each rank and why certain areas scored certain totals was given as a final step. The final score could then be taken more as a suggestion of success any project may have had according to the authors' opinions on the matter. The rank for each project was to simply create rationalizations and organization for the final results. Some projects may have scored lowly in specific areas, giving them a low score overall, so the final step would serve as a notification of personal ranks of projects rather than statistical rankings of projects.

3.2.4. Project Ranking Form

The following chart is the project ranking template form used to systematically analyze the specific criteria determined pertinent to a given potential project. The baseline score for any criteria given is 50, and any non-neutral score will correspond to an increase or decrease in value. The total score is the final score prior to weighting, whereas the adjacent score is the final score for the project. This form outputs to a variety of charts so as to present the data in an interpretable fashion.

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	50	2.5	125	625
		Education	50	2	100	
		Government	50	1.5	75	
		Enviornment	50	4	200	
	Longetivity	Amount of Content	50	2	100	750
		Enables other Projects	50	4	200	
		Expandable	50	4	200	
	Community Development	Transit	50	3.5	175	500
		Town Upkeep	50	3.5	175	
		Education	50	3	150	
University	Cost	Tuition	50	3	150	500
		Investment	50	4	200	
		Sponsor	50	3	150	
	Image	Humanitarian	50	3.5	175	750
		Cutting Edge	50	2.5	125	
		Green	50	4	200	
	Sustainability	Renewability	50	5.5	275	625
		Efficiency	50	4.5	225	
Student	Group Dynamics	Diversity	50	4.5	225	500
		Organization	50	5.5	275	
	Community Involvement	Gov/People	50	4.5	225	625
		Non-WPI Interaction	50	5.5	275	
	Skill Development + Presence	Educational Value	50	5	250	750
		Qual + Quant of Data	50	5	250	
Project Title:	Hello World!			Total Score:	4500	5625

Figure 3.1

3.3. Housing Ranking

Determining appropriate housing for students living on site was relatively simple. The first step was to find as many possible options as possible in order to ensure the widest selection of housing was available for the ranking system. The best types of living spaces that could be used were either housing at another campus, an apartment complex that was either rented out or purchased by the University, or a house that was purchased and renovated by the University. Therefore, by talking to as many colleges, realtor's agencies, and property owners in the area as possible, the widest sample size for our study was obtainable.

After the property search was completed, the next step was to go to each one and evaluate them for all of the available criteria that were of importance to WPI and its students. Through a combination of crime index rating and specific localized potential hazards to the location itself, the security of the site was determined. Next, the average background noise heard from the building, as well as other noise factors such as construction in the area, were evaluated to estimate the average noise level of the area. After that, whether or not the housing in question came furnished by the original owner or if WPI would need to pay for furniture was considered. Checking the quality of the plumbing to ensure reliability of the piping, as well as ensuring sufficient water flow through the toilets and heat levels for the sinks and showers, was tested. The amount of livable space per student was measured. The location of the housing was noted, and the average distance from the center of Bar Harbor was recorded. Available transportation services were noted, and their quality was estimated. The cost of the living conditions per student was recorded as well.

After all data was collected, the information was placed into our spreadsheet ranking

system. The system took the raw data provided and evaluated each criterion based upon a set of ideal conditions. All categories were given a final result from zero to one hundred, and the total was added up to give a final weighted value that represented the overall quality of the housing.

Security was weighted on a linear scale based upon the location's crime index rating. This method gave housing a fair metric of security since crime index was already based on a well-accepted system. The history of the area was then taken into account and adjusted the rating based upon specific potential problems or enhancements. Below is the weighted linear equation:

$$Crime = 110 - (Crime\ Index) \times 10$$

Equation 1 Crime

Noise worsened rapidly early in scale but then tapered off after reaching unacceptable levels. Therefore, this metric was based upon an exponential decaying curve that followed this line of logic. This type of weighting was appropriate to the description of noise's impact upon the residents living there. The ranking was defined by the following IF statement, where "D5" = Noise Level:

$$Noise = IF(D5 = "Noisy", 10, IF(D5 = "Mildly\ Quiet", 75, IF(D5 = "Moderate", 50, IF(D5 = "Mildly\ Noisy", 25, 100))))$$

Equation 2 Noise

Furniture was evaluated as a basic yes or no question that imparted a certain amount of points based on presence. The user is left to determine how important furniture was based upon their setting and budget. The ranking was defined by the following IF statement, where "D6" = Amount of Furniture:

$$Furniture = IF(D6 = \text{Fully}, 100, IF(D6 = \text{Partial}, 50, 0)$$

Equation 3 Furniture Quality

The pluming was a set of mostly well-defined metrics, with a limited amount of subjective material built in. The number of bathrooms per person was first found and recorded. Next, the immediate area was searched, and the owner was questioned to ensure that the pipes were reliable. The water pressure and heat levels were checked to ensure their workability. These considerations combined to give a final score. The linear function is displayed beneath:

$$Plumbing = 10 \times (Plumbing\ Quality)$$

Equation 4 Plumbing Quality

The size of the housing was evaluated based on area per person. For a small room, increasing the size vastly increased the value to the user, but extremely large rooms reached a maximum level of acceptability at a point. Therefore, size was based on an exponential decaying scale that reflected the decay in importance after a certain size, as shown below:

$$Space = 100 - 100 \times e^{-50 \times (\frac{[Total\ Space]}{[Number\ of\ People]})}$$

Equation 5 Space

The location of the housing measured the distance from the housing to necessary living facilities, such as food and transportation. For Bar Harbor, this value was measured from distance of the housing to the town center, where most of the town's public facilities were located. This metric was also an exponential decaying scale based upon distance because the

difference between miles becomes smaller as the total distance increased. The function is shown below:

$$Location = 100 \times e^{-(\frac{[Miles\ from\ Town]}{10})}$$

Equation 6 Location

Internet Access is an extremely important aspect of a project housing location. Students must be able to access online websites in order to update data, contact advisors and sponsors, and submit reports. The rank for Internet Access was established by fitting the actual speed in MB/s into an exponentially decaying curve that factored in number of people, as shown below:

$$Internet\ Access = 100 - 100 \times e^{-([[Highest\ Speed\ Available]\times[128]])/([190]\times[Number\ of\ People])}$$

Equation 7 Internet Access

The cost of the location was evaluated by comparing overall price to the number of students in a given living situation. This value for both purchasing and renting was fitted to a decaying power function so that the data would fit neatly and understandably. Both equations are displayed below:

$$Rent = 100 \times (1 \Big/ \frac{Total\ Rent}{\frac{Number\ of\ People^2}{500}} + 1)$$

Equation 8 Rent

$$Purchase = 100 \times \frac{1}{\frac{Price}{650000}^2 + 1}$$

Equation 9 Purchase

After all of the data was compiled, all the metrics were consigned into a radar graph so that the overall quality of the housing could be visually perceived in a clear and meaningful manner. At the same time, the graph allowed for clear distinction between individual metrics. By putting the data into this form, the user was allowed to easily create subjective material based on the objective results.

3.3.1. Housing Ranking Form

Below in Figure 3.2 is the table developed to gauge how well a given property would serve to house students at the Bar Harbor Project Center. A single template was developed to assess properties for both renting and purchase. This table outputs data into a radar chart and an automatically generated abstract so that the data can be evaluated via the evaluators preferred medium. Figure 3.2 is a relatively average example of a hypothetical housing accommodation.

Address	example address		
Criteria	Units	Value	Score
Type	Apt./House/bldg?	house	
Security	Crime index	4	70
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Mildly Quiet	75
Furniture	Fully/Partial/None	Partial	50
Plumbing Type	Sewer/Septic	Sewer	
Plumbing Quality	0-10	7	70
Bathrooms	No. of bathrooms	3	
Utilities	Yes/No	Yes	100
Total Space	ft^2	2500 ft^2	75
Max legal occupants	No. of people	12	
Bedrooms	No. of bedrooms	4	
Location	Miles	3.5 mi	70
Internet Access	Mb/s (shared)	25 Mb/s	75
Parking	No. of parking spots	6	
Rent (Total)	$ per week	$3,600	74
Rent (Individual)	$ per person per week	$300	
Cost	$ total		
Taxes	$		
Total	Scaled Value	586	

Figure 3.2

3.4. Sponsor Analysis

Locating sponsors was one of the more involved tasks of the research for this report. The work consisted of travelling around Bar Harbor in order to recognize business presences, researching those businesses either through Internet resources, and receiving information directly from the organizations. The majority of work in locating proper sponsors came from researching online for companies and organizations in the Bar Harbor area. If any organizations found in our research showed promise, the contact would be made first via phone or email and then in person of possible. If contact could not be made, then the sponsor information would be determined to the best of our abilities.

Analysis of potential sponsors was based upon a questionnaire covering a range of topics. In order to avoid placing a personal bias on the rankings, the ranking was based on yes or no questions or raw, non-subjective data. The criteria being addressed in this analysis included the size of the organization, the organization's history of sponsorship, the organization's characteristic of non-profit or for-profit, the organization's interest in sponsoring a project, and the types of projects the organization may have been interested in sponsoring. This arrangement of questions aimed to provide a quick idea of the likelihood of sponsorship from the organization.

The sponsor analysis questionnaire was designed for rapid assessment in mind and had some functions built in to speed up report writing. An equation was written to interpret the data entered into the questionnaire and convert that data into a brief description of the company in an easily readable form. The same information provided in this summary paragraph could be

gathered directly from the questionnaire results. However, the written summary showed more of the reason why the questions were asked, not the actually answers to the questions. The equation was adaptable to accommodate changes to the questionnaire and changes in the targeted demographic for potential sponsors.

3.4.1. Sponsor Analysis Form

Figure 3.3 is the template of the sponsor analysis form. The form uses yes or no questions to generate a brief statement about the sponsor. This form does not explicitly rank the sponsors; rather it allows the end user to sort through the sponsors who fall under certain criteria. For this reason, most of the Sponsor analysis is hand written.

Name of Company	Type Name	Template
Size of Organization	Number of Employees	0
Type of Organization	Write Type	
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	No
Workspace	Yes/No	No
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	No
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 3.3

4. Results

Seven weeks of project work yielded a complete picture of the suitability for Bar Harbor as a project center location. Many potential project ideas were determined suitable for IQP project work, a sufficient number of sponsors are in the immediate area, and reasonable housing solution was also obtained.

In total, twelve projects were studied in depth to determine whether they were suitable for student use. These projects are listed by descending score in report format throughout in this section, and each goes into detail describing how well they fit the categories of interest discussed in the methodology. Each also has a subjective analysis to help cover the topics that could not be inserted into our ranking system. The rest of the researched projects may be found in the appendices.

Twelve possible sponsors around the island were also researched by the project group. The group recorded all pertinent information about each sponsor and sorted through the information. A brief history about each sponsor, the potential project types that they could assist, and the potential sponsor's contact information were all recorded. All of this information was rewritten in report format and can be found in this section.

A great deal of trouble arose with the housing research, as revelations that occurred later on in the project caused much of the group's earlier research to be near worthless. An explanation of the problems encountered and our solutions to work around the constraints placed upon student housing are discussed in this section as well. The housing forms are included in the appendices.

4.1. Project Results

4.1.1. Trail View Continued

4.1.1.1. Overview:

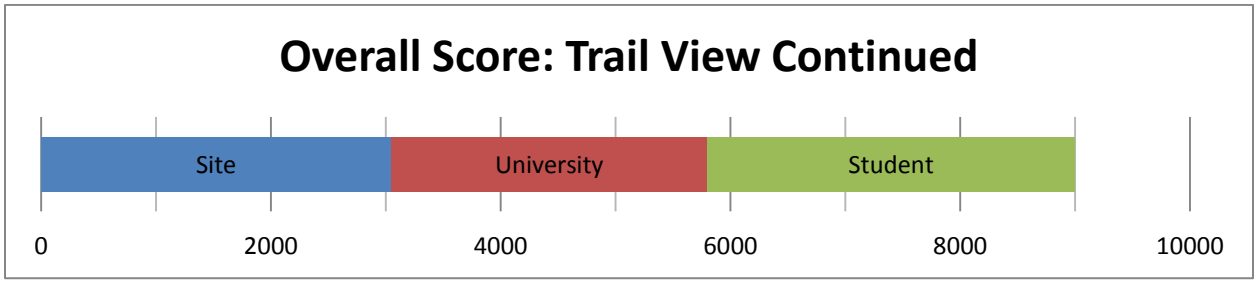

Figure 4.1

The continuation of the Trail View project would involve the documentation of the trails of Acadia National Park using the techniques developed in the summer of 2012 by the first Trail View team. While working on this, students would take panoramic photos, atmospheric data, sound samples, and various other data, and place them into the Trail View software. The students working on this project could work on the web side of development to integrate the non-panoramic photography and data into the web interface in an ergonomic way. This project scored the highest of the projects ranked because it encompasses a wide scope of work.

4.1.1.2. Statistics:

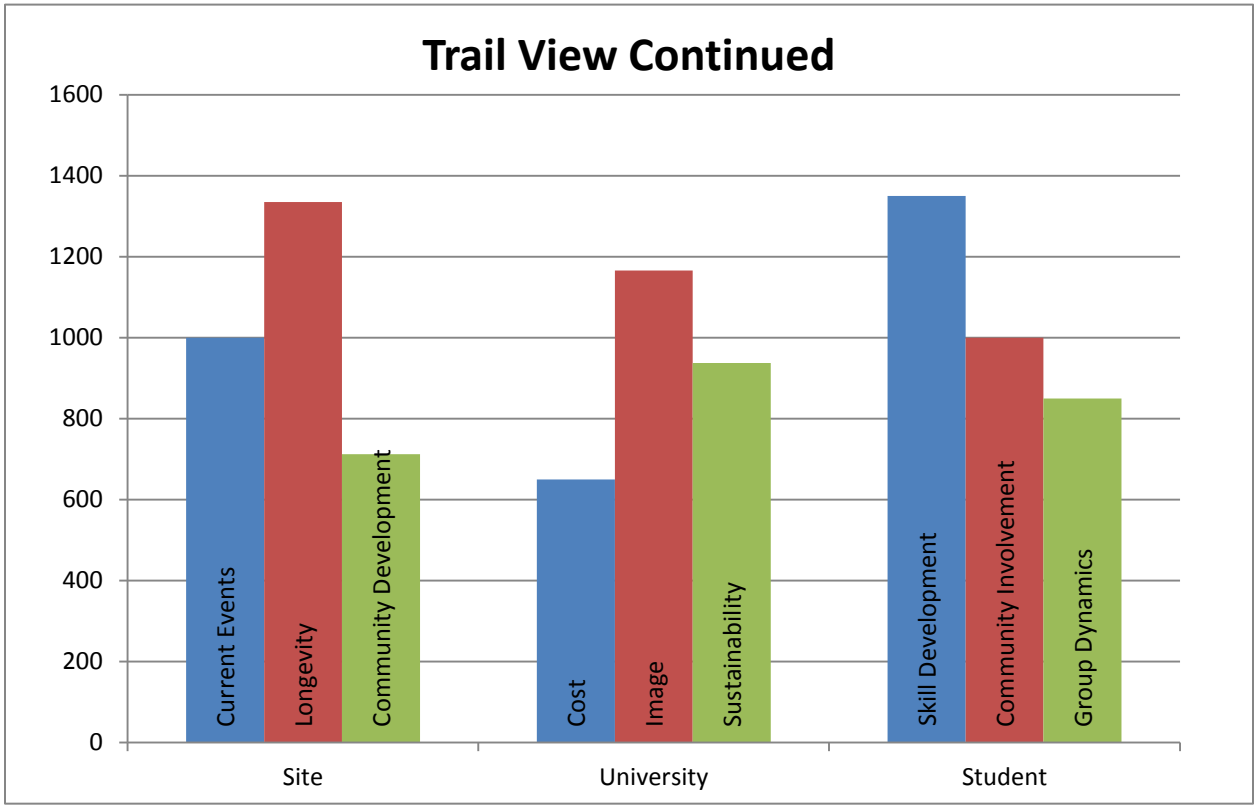

Figure 4.2

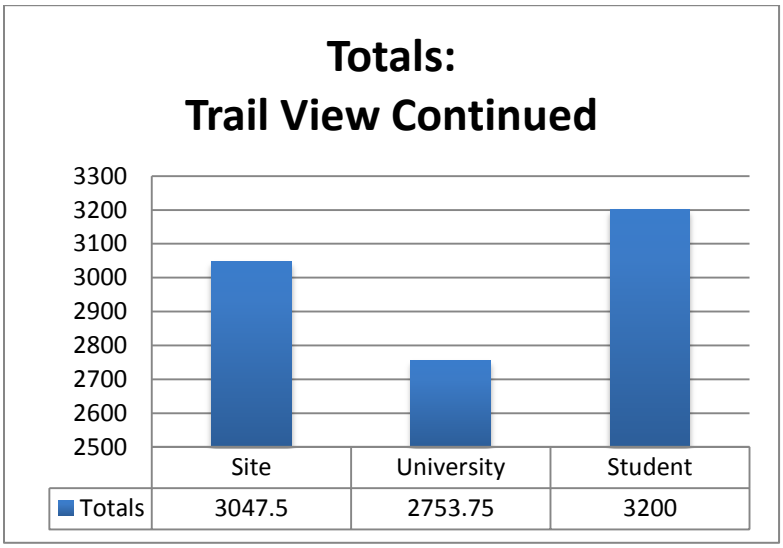

Figure 4.3

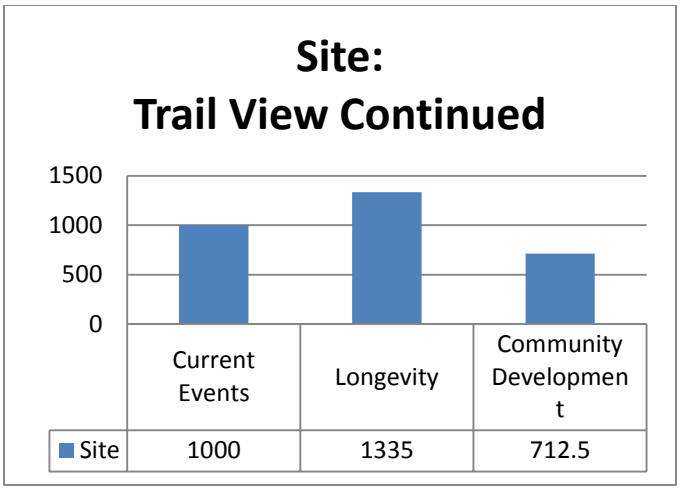

Figure 4.4

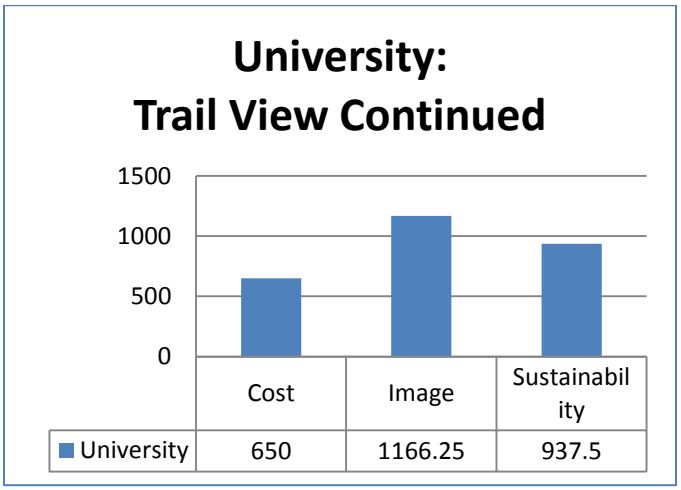

Figure 4.5

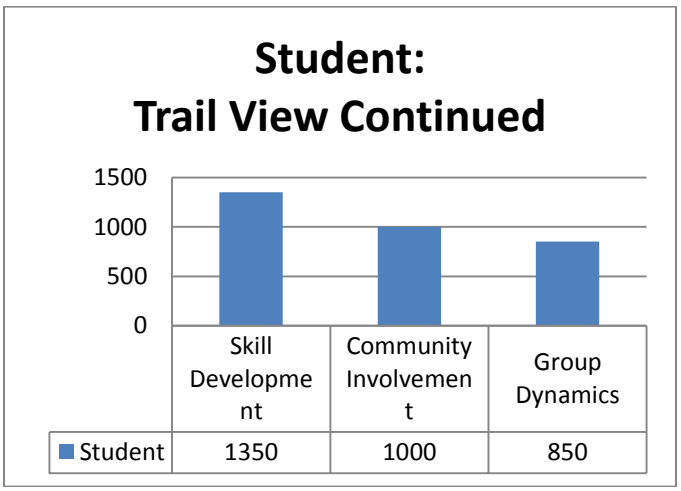

Figure 4.6

Site:

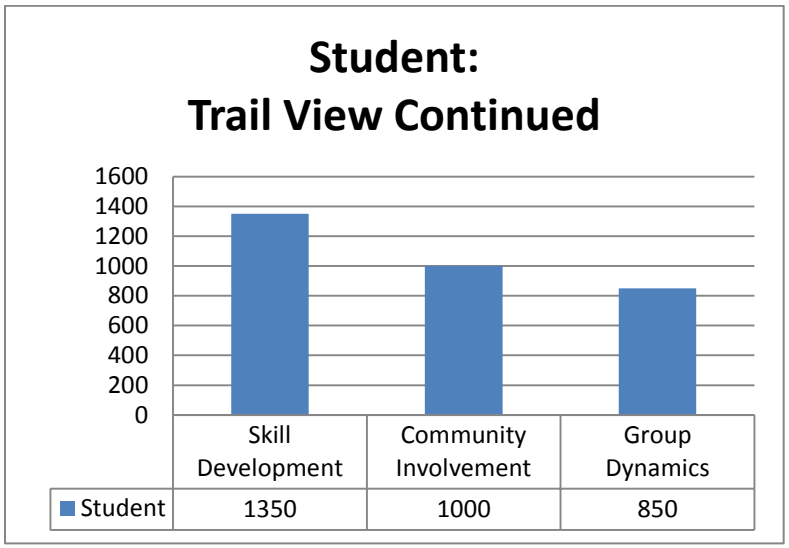

Figure 4.7

This project has the potential to make a massive impact on the site in almost every way. The project work benefits business in that it, once completed, can attract more people around the world to Acadia, and Bar Harbor. Businesses depend on a steady flow of tourists to maintain their income, and any increase to tourism has a benefit to the business in the area. The educational impact this project could have with regard to the current events would quite high when compared to other project work because the project is effectively a documentation of current events in Acadia National Park the will be accessible to the people in an ergonomic interface. While working in the national park, the students will be working within a government run location; therefore, if the project goes well, the work will have a positive influence on the government. The environmental implications of this work are enormous, and range from documenting the beauty of the land scape, to amassing long term data sets of otherwise hard to find data.

The longevity of this project work should be of no concern to the site due to its time consuming data collection needs. The Amount of content available for this project to thrive off

of is near endless. Not only are there hundreds of miles of trails in Acadia National Park to capture via Trail View, there is also the seasonal aspect to the data. How the trails look across seasons or years, and how the atmospheric data changes over these collection points is a key part of the project work. Because this second continuation of the Trail View project can only tap into as much or slightly more of the data held within Acadia National Park, the project will still leave a large amount of room for other projects to come in to the project center at a later time. Furthermore, the entire objective for the Trail View project is to have an expandable data set where the work is continuously evolving, therefore in terms of expandability this project performs exceedingly well.

The impact on the development of the community also fares quite well with respect to other projects. Trails in Acadia National Park are a primary transportation means within the park, and through the documentation of the trails via Trail View, there would be some benefit to the development of transit on Mount Desert Island. The Trail View falls a bit short with respect to town upkeep because it is not working directly with the town, however it does serve to document any issues with the trails, which are part of the tourist attraction to Bar Harbor, and thus indirectly helps with town upkeep. On another note, the educational impact on the community could be quite sizeable because it uses modern technology to serve information that would otherwise be inaccessible to many in the community.

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4.1.1.3. University:

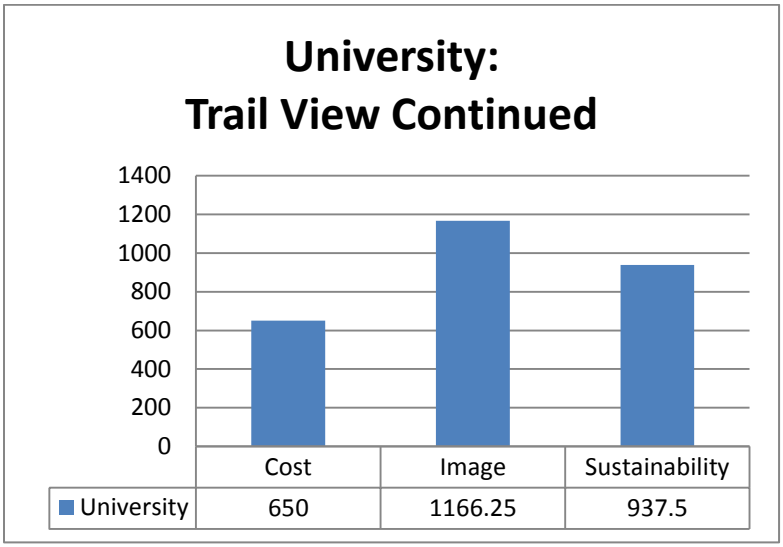

Figure 4.8

The continuation of the Trail View work has the potential to positively impact the university in several ways. When considering the cost of the project, the project fairs better than most, but it is not ideal. For instance, the impact on tuition is just average compared to other projects in that it does not have a negative or a positive impact on the criteria. The investment posed by this project is rather significant due to the camera overhead costs, the microphones, and atmospheric data instrumentation, and the web hosting. This is offset by the high likelihood that the project will be sponsored. Trail view has a high opportunity for sponsorship because it has such graspable delivered product.

The image portrayed by this project is humanitarian, cutting edge, and green due to its high tech involvement in Acadia National Park. The humanitarian aspects of the project include the increased accessibility of people to the park through nonphysical means, and the ability for the project to educate the community on Acadia National Park. The Trail View project is cutting edge in many ways because it is one of the earliest dives in to the field of panoramic trail documentation, and it aim to provide more than just images. The work will also be one of the

largest attempts at thoroughly documenting an entire national park in one system. Considering how this project will portray the image that Worcester Polytechnic Institute is a green university leads to the projects involvement in collect long-term atmospheric data throughout the park that can serve to provide insight into the changes in the park over the years.

Trail view has the potential to benefit the aim for Worcester Polytechnic Institute to become more sustainable. Throughout the data collection process, information on wind speed and temperature are collected. This data can be used to prospect appropriate location for renewable bind power. Due to the use of technology, and a systematic collection methodology, the project can be considered efficient in terms of efficiency. In the event that crowd sourcing is properly implemented in the future, the Trail View project would be a masterpiece of data collection efficiency.

4.1.1.4. Student:

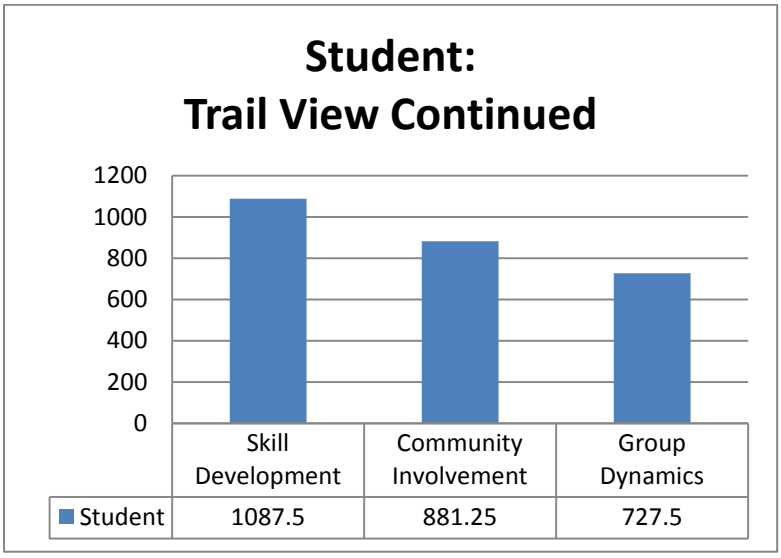

Figure 4.9

The continuation of the Trail View project presents a great opportunity for positive impact on the students involve in the work. In terms of group dynamics, the project is open to a diverse range of majors, but may require some programming background in the team. The data collection requires very little skill with photography, and the atmospheric data collection tools, but meshing the collected data with the existing interface will require an understanding of the software created by the summer 2012 team. Massive amounts of data can be collected for this project, and organization of this data will be key to the success of the project as a whole.

This project work is directly involved with the community due to its involvement with the park and high potential for sponsorship. The work will bring students out of the house, and into the field, whereupon their work will be used to directly benefit the communities and sponsors. The sponsors who are like to work on this project are those that already exist as community or government bodies within the park, making work with the government and people very likely. Interaction outside the university exists all the way through the project's data collection period where the students will be out and about in Acadia National Park.

The impact on skill development is quite high in this potential project due to its favorable educational value and the quality and quantity of data that this work can provide. The students working on this will learn how to create panoramic pictures and link them via software, learn how to take atmospheric measurements, and learn how to develop a crowd sourcing interface. The quality and quantity of the data collect in this project is far above the many other projects ranked. The quantity is defined by the amount that the student can physically collect in their time, and the quality is predefined by the data itself. The long term collection of small bits of atmospheric data will make a high quality atmospheric model, and the massive amount of trails in Acadia National park ensure that quantity will never be a problem.

4.1.1.5. Personal Analysis:

The continuation of the Trail View project is at the top of the list when addressing the most feasible projects in Bar Harbor. The work will benefit the Site with its final deliverable, it will benefit the university with a positive image boost in the Mount Desert Island region, and it will provide a unique experience for the students who take on the project. A few concerns with the project are the cost without sponsorship, and the ability for different teams of students to smoothly continue the project fast enough that the work does not fall to the back of the community's mind. Without sponsorship, moving to a larger scale version of the Trail View website will incur a massive cost for the professional street view API, and increase web hosting costs enormously. Otherwise, this project is highly feasible and should be considered for immediate continuation.

4.1.2. Water Quality Due to Boating Traffic

4.1.2.1. Overview:

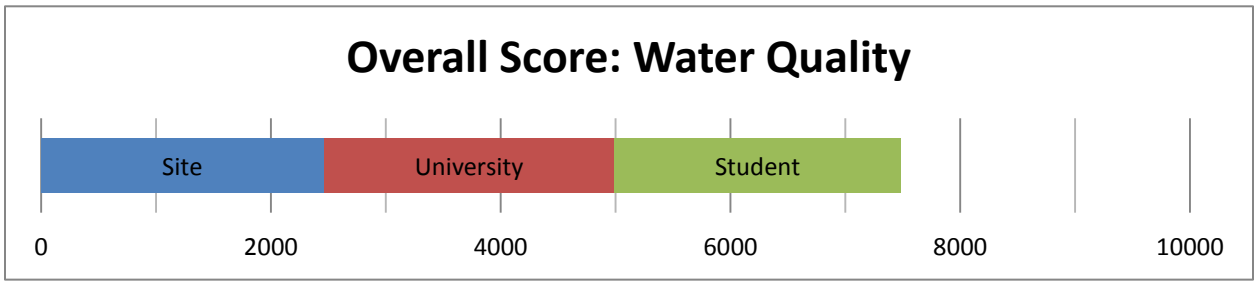

Figure 4.10

This project will research and analyze the effects of boating traffic on the water quality of the ocean adjacent to Bar Harbor, Maine. Large commercial vessels and many smaller boats travel through Bar Harbor's Frenchman Bay and unintentionally release unwanted chemicals into the water. This project will examine exactly how much boating traffic pollutes the water in Frenchman Bay through basic water quality studies and documentation of certain characteristics of the water. Students must first learn what boats travel in and out of the harbor in order to hypothesize what pollutants these vessels discharge into the water. The students can gather water samples from specific areas around the bay and run simples tests, such as pH determination, bacteria count, and oil concentration. Visual documentation can also provide general appearance of quality. These gatherings can be compared to commonly known clean water sources of similar magnitude. Students could generate a final evaluation on the effects of boating traffic on water quality in a given period of time, or they could compare their results with other findings from a different time of year, depending on the availability of A and E term projects. This project could continue for multiple years and result in another project that develops methods for reducing boating pollution.

4.1.2.2. Statistics:

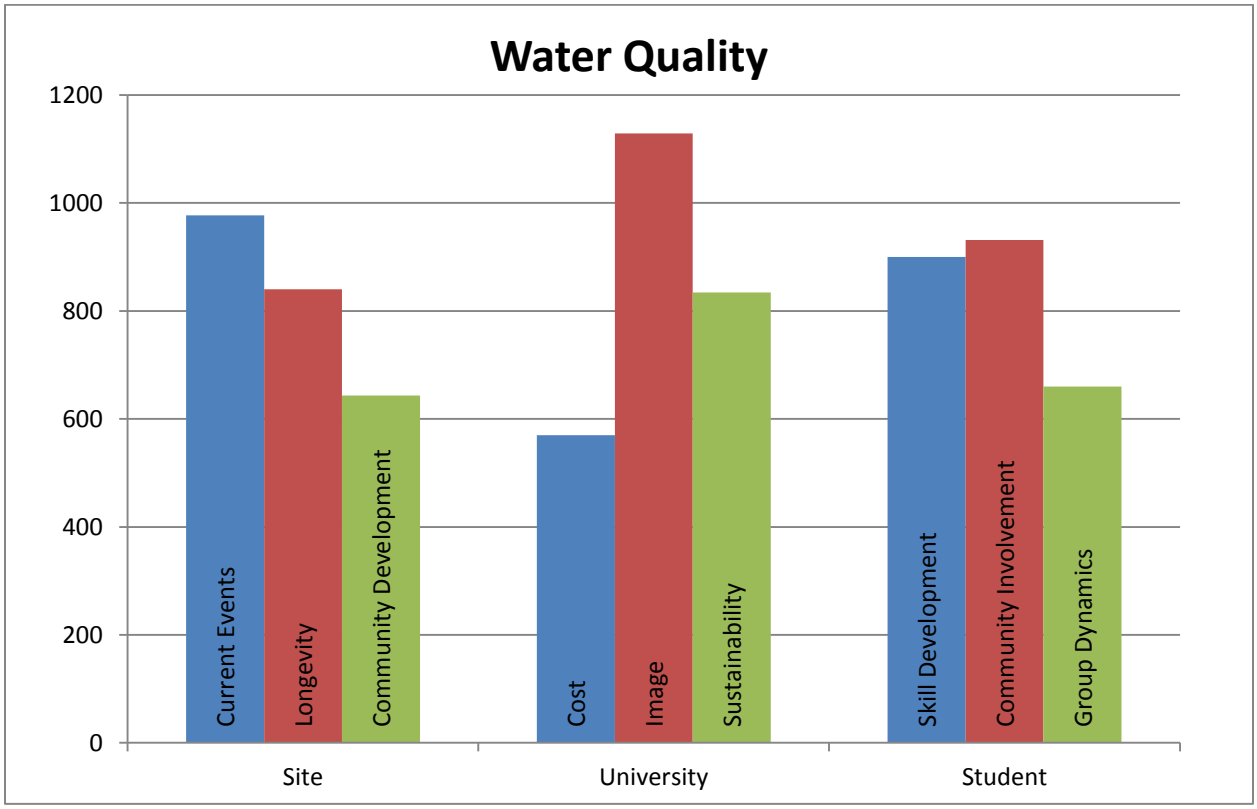

Figure 4.11

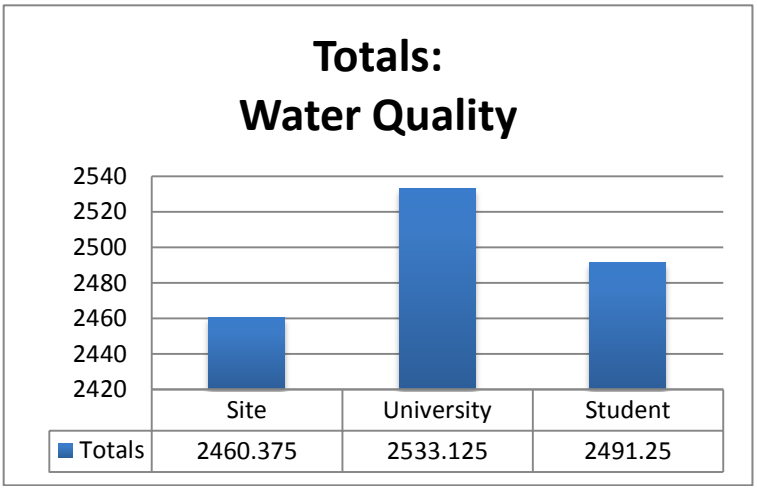

Figure 4.12

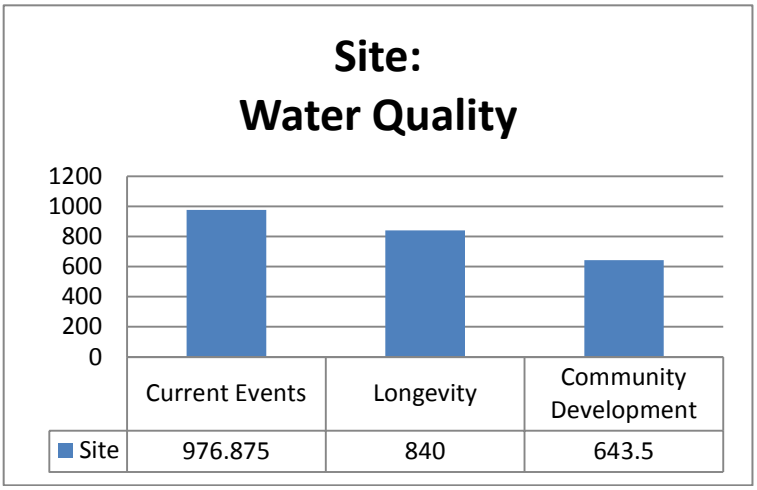

Figure 4.13

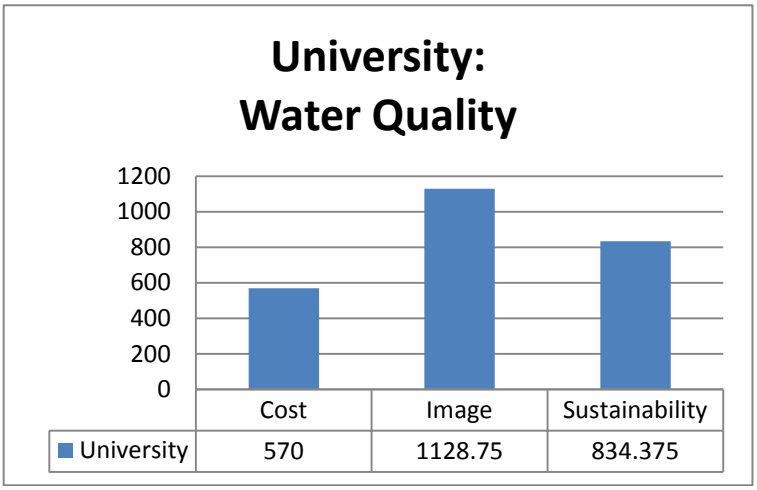

Figure 4.14

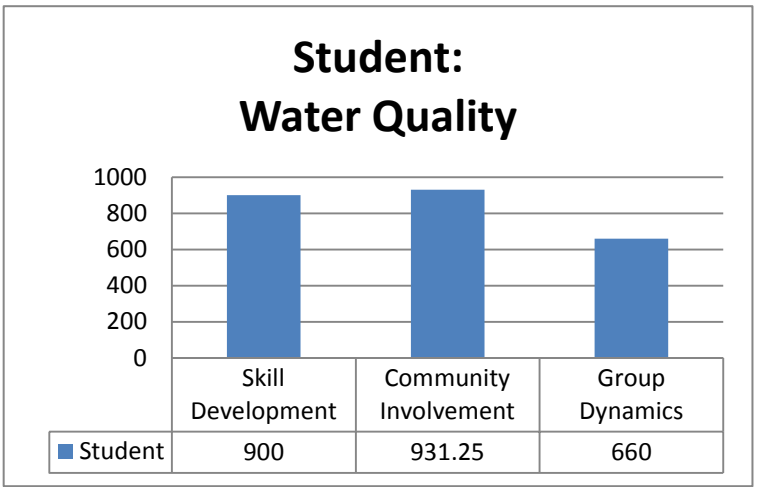

Figure 4.15

Site:

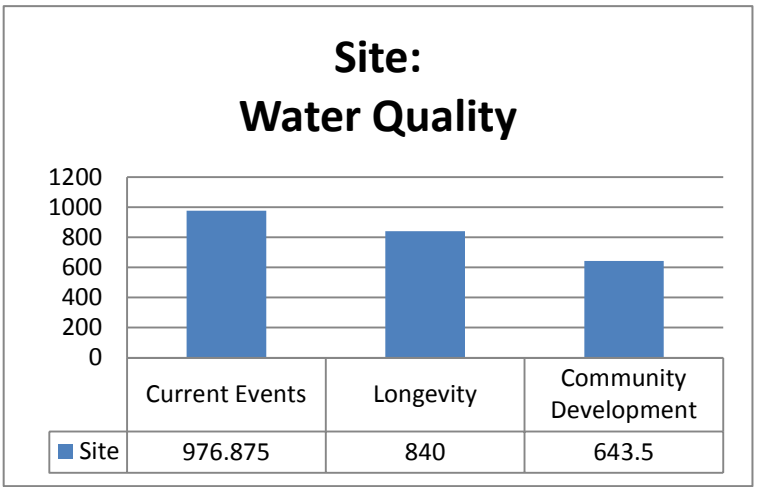

Figure 4.16

Public transportation services, oil shipping, and fishing all utilize boating for their businesses. New regulations to boating traffic would directly affect these businesses, and this project could potentially suggest restrictions to boating traffic. Businesses may have to alter their boating methods in order to help improve water quality. The general public would benefit from knowing the progress and results of this project because changes in boating traffic could alter some maritime transportation services. Contaminated water may detract people from touring the area and exploring the marine life of Bar Harbor. The government must pay attention to this possible issue in order to continue sufficient levels of tourism. Polluted water can destroy the natural habitat of Bar Harbor's marine ecosystems. The natural surroundings of Bar Harbor are main incentives for touring the area, so environmental protection is extremely important throughout the island.

This project would provide an average amount of content by documenting the water quality of Bar Harbor's main bay. The information for one report could provide insight into more efficient and environmentally friendly means of marine travel for the government of Bar Harbor. This report would not be restricted to the Bar Harbor area; expansions around the island are

possible. Water temperature data, bacteria count, pH levels, and noise are all useful pieces of information for tourists searching for the best locations for boating or swimming. This information could begin new projects pertaining to maintaining or documenting the water quality around Mt. Desert Island or developing methods of more environmentally friendly boating traffic. The expandability of this project is high, but the amount of content per report may be limited to certain criteria.

Any alterations in boating methods this report could suggest would affect boating transit, which could potentially harm tourism. Restrictions in boating traffic may increase in price or delay, which could turn people away from using boating services. Tourists may read a report discussing the poor quality of the water surrounding Bar Harbor and may avoid visiting the coastline. Town upkeep is also an important aspect of Bar Harbor. The town must keep its appearance agreeable to the public in order to attract tourists. Polluted water is not a quality description Bar Harbor would like to boast. Therefore, evaluations of the current status of bay could prove to be extremely important for the aesthetics of the town. The overall educational value for the general public would not be incredibly high for this project, but the other projects that could result would provide worthwhile information in regards to water quality and suggestions for improvement.

4.1.2.3. University:

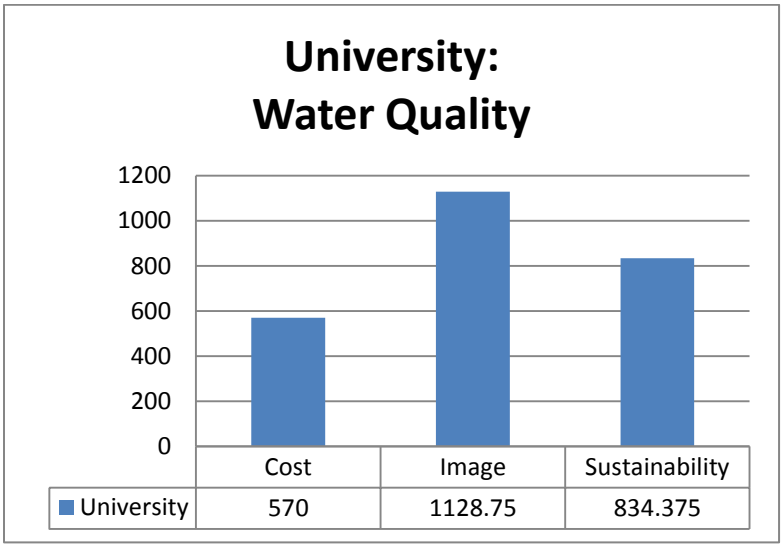

Figure 4.17

Cost for this program would compare closely to the 2012 E Term Bar Harbor projects. Tuition may increase from the change of year and additional costs may arise from purchasing equipment for water quality tests, but these costs will be minimal. This project would focus mainly on gathering data about the water quality of Bar Harbor. Future projects enabled by this project would delve further into methods for decreasing water pollution around the island. Therefore, overall expense would be practical when compared to other E Term IQPs. The university would not need to invest highly in this project because the objectives are mainly student progressed. Students will gather information and report on that information. The town may not be as inclined to sponsor this project the first year because data will not be complete or fully analyzed. The town would be more likely to sponsor future projects that develop ideas for improving water quality after collecting and evaluating the statistics.

The image of this project will highlight a green attitude. Frenchman Bay alone is an individual environment, and researching possible harms introduced by boating is a green opportunity. Developing ways to protect this environment shows a strong attitude for

preservation. Providing people with water quality information is a humanitarian effort to protect people from possibly harmful pollutants in the water. The innovative aspect of this project would be limited the first year because the majority of work will be accumulating statistics. Future projects would present more cutting-edge developments through suggestions for improving water quality. Maintaining the water quality of Bar Harbor is an important task for keeping the environmental aspect of the area up to normal extraordinary standards.

A major goal of this project could potentially be the sustainability of the water quality of Frenchman Bay. Future projects could provide feasibility reports on the likeliness of maintaining this large area of water. These reports could enable projects that serve to develop methods of maintaining the water quality. Higher efficiency of boating traffic could help sustain water quality, as well as methods of actually cleaning the water. This project may research ways of efficiently cleaning the water or sustaining the clean water. Future enabled projects certainly will focus on these goals of efficiency and renewability.

4.1.2.4. Student:

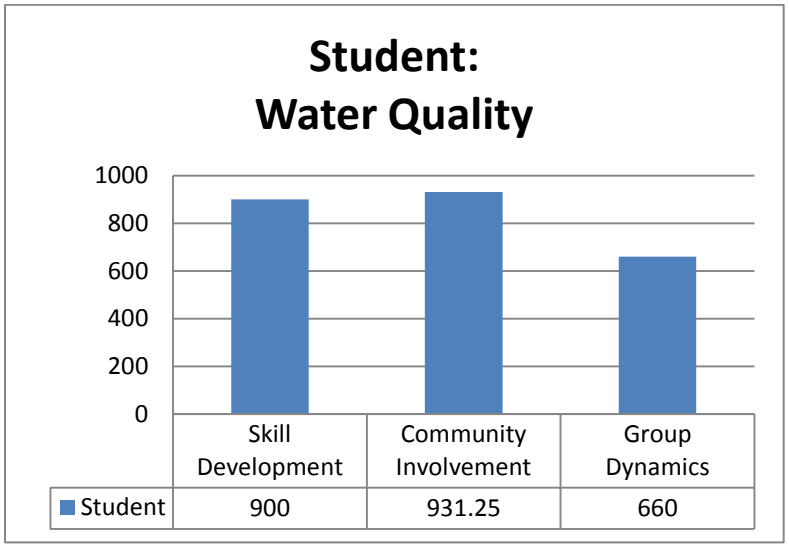

Figure 4.18

For the subjective portion of this project, student diversity will remain high. Any student can gather physical quality data about certain aspects of an area. More in depth analysis of water quality may require more specific student concentration. Analyzing particular information about pH and contaminant levels would be easier for a student pursuing a biology-related major than for a student majoring in electrical engineering. Students must gain a sufficient background in the project material before engaging completely in the analysis. The potential research will require an adept skill in environmental analysis and understanding of certain equipment. Student diversity for this project ranks slightly above average compared to other possible projects in the area because of this relatively easy opportunity to develop an understanding of the material before attempting to gather results. Students must also remain reasonably organized for the entirety of this project because they could potentially be working with the town. Organization is a great skill to have in general, and this project would promote improvement of organizational abilities.

The students working on this project will not interact directly with the public but may

consult with some town officials due to the specifics of the undertaking. The town will appreciate collaboration through meetings discussing the current situation of the water quality if sufficient data were to suggest significant circumstances. Students may interact with boaters for a better understanding of boating traffic around Bar Harbor and how certain vessels may pollute the water. The majority of this project will involve outdoor environmental data collection with reasonable non-WPI interaction.

The educational value of this data could be extremely valuable for the town in regards to sustaining its natural appearance. Students could gain an understanding of the biology of marine ecosystems and how they are affected by modern boating traffic. Gathering data will require understanding of certain equipment and will require sufficient methods of organization. Students will be able to produce an overall result about the current situation of water quality surrounding Bar Harbor. This project will potentially provide a reasonable amount of quality data for the town, but less so for the student. Depending on a student's major, the quantity of data will exceed the quality of data in regards to student education.

4.1.2.5. Personal Analysis:

This project will make a decent IQP, but students may need to be slightly specialized in their major or at least put in extra time for pre-IQP research. This project would require detailed understanding of some marine equipment and the many aspects of boating and may be more suitable as an MQP-type research opportunity for students with biology-related majors. Students would need to be willing to meet with town officials to discuss important topics about water quality. An IQP project of this nature would be feasible over multiple years of work. The amount of information needed to produce a final result would be relatively large, similar to the Bar Harbor Trail View Project. Other data could still be gathered around the coast of the island for the general use of the public. People may like to know the cleanest water locations along the coast. This IQP could enable other projects for researching this data and gathering other lesser-known but still significant information about the island. Sponsorship from the town is extremely feasible because the town is currently concerned with water quality. This project is an excellent opportunity to work with the town in developing innovative ways of keeping harbors clean and safe.

4.1.3. Light Pollution

4.1.3.1. Overview:

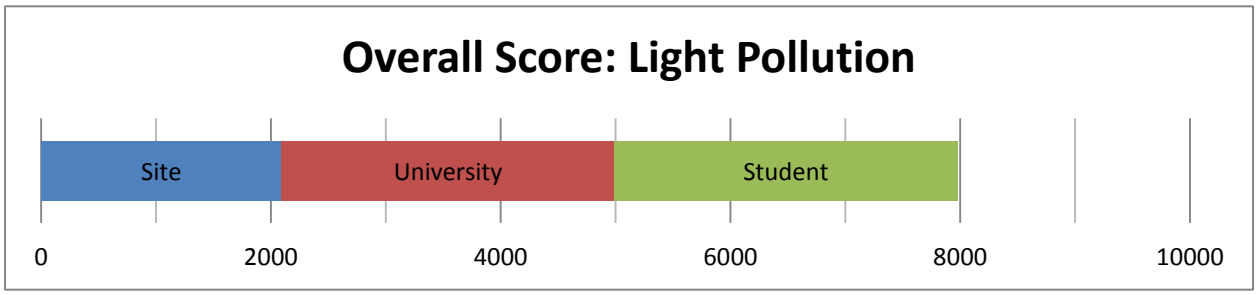

Figure 4.19

Light pollution is a developing issue throughout the world in many major cities. Unnatural light from streetlights, houses, and cars create a day-like night, where visible stars are limited and unlit locations are nearly impossible to find. Bar Harbor is beginning to develop this problem in the center of town. Stray lights from town are visible from miles away, detracting from the natural setting of the area. This project will serve as a survey of the town and a documentation of the light pollution. Students will study and observe the effects of unnatural light on the environment and possibly offer suggestions on how to improve the town lighting. Future projects, if sponsored by the town, could implement these suggestions if they are reasonable and feasible.

4.1.3.2. Statistics:

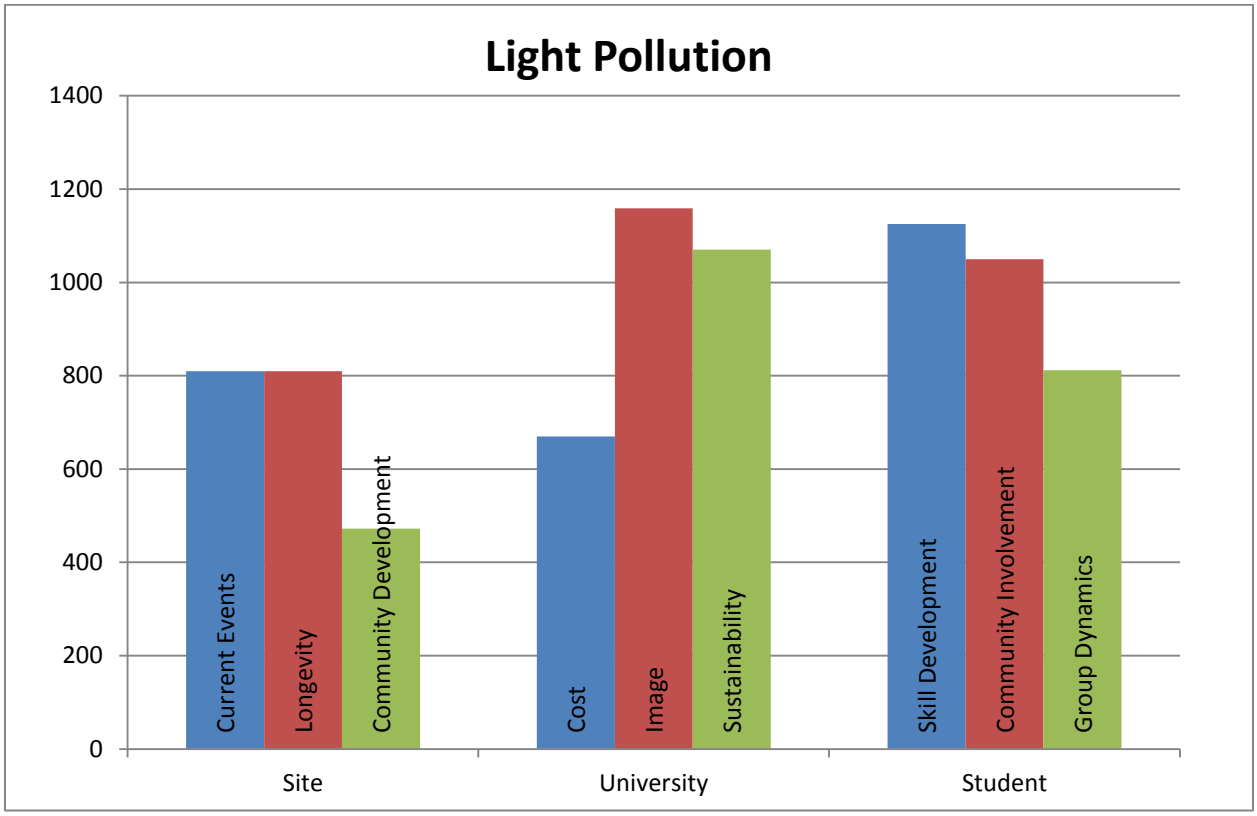

Figure 4.20

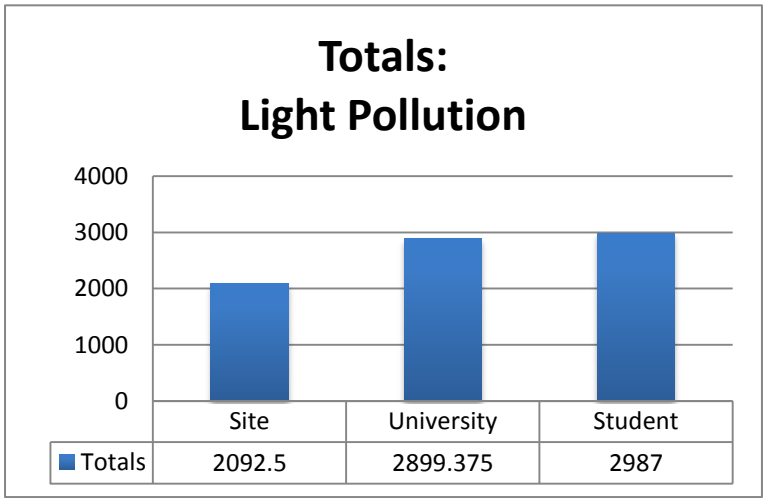

Figure 4.21

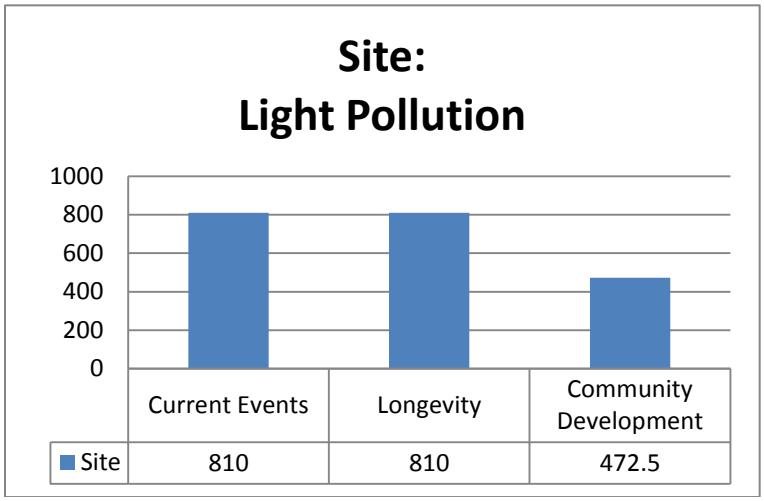

Figure 4.22

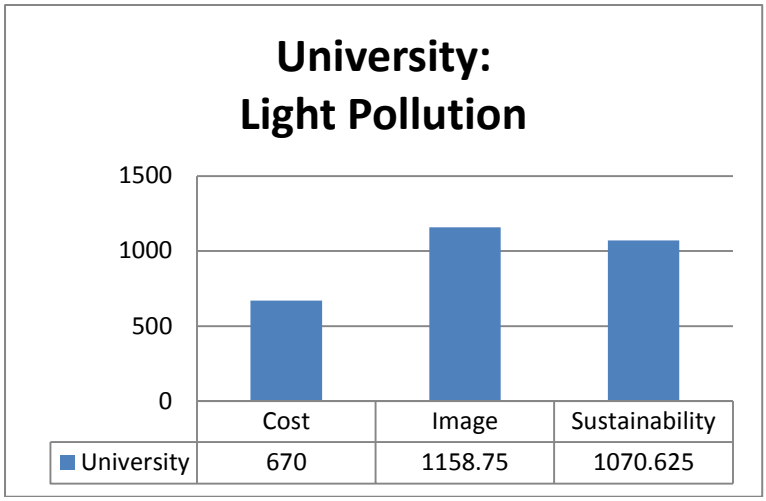

Figure 4.23

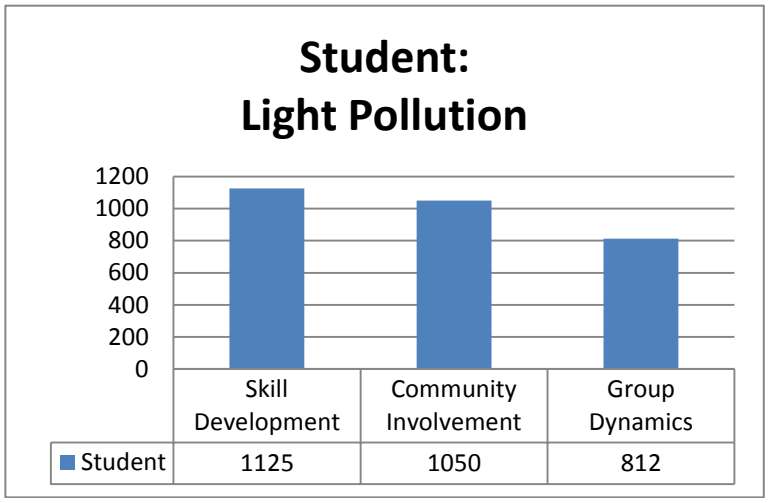

Figure 4.24

Site:

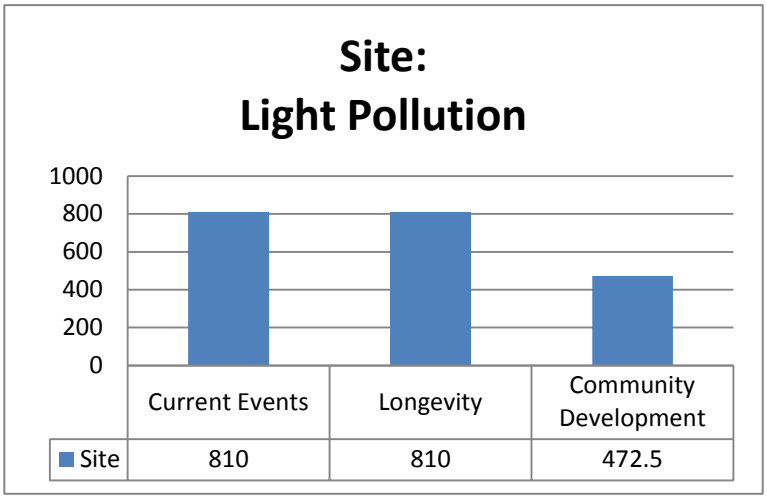

Figure 4.25

A project researching the light pollution in a busy area could potentially harm certain businesses if lighting were to be reduced or reconstructed. Certain areas of town may become darker, which may impede people from visiting at night. Nighttime businesses like bars or restaurants may suffer slightly from a loss of customers. People will want to know exactly where and when these lighting changes were taking place, but they would not necessarily dislike the alterations. The more environmentally friendly lighting may attract more people to the more scenic part of town at night, which would possibly benefit nighttime businesses. The government of Bar Harbor would be the main proponent of this project. No changes could be made unless the expressed consent of the Bar Harbor government, restricting this project to mainly research-based. By developing ideas for better lighting situations, this project could benefit the surrounding environment of Bar Harbor. Less light pollution would leak into Acadia National Park, further improving the natural aspect of Bar Harbor in general.

This project will not excel in the amount of content it presents, but there will be sufficient content in order to make a complete report. The majority of information will be surveys of lighting in the town and observations of specific areas in order to make suggestions for

improvements. The only other project that may result would be the physical installation of the new lighting, which the town may do alone. The project may expand past one year in order to gather sufficient data, but the overall expandability is limited to that collection of data.

The nighttime lighting scheme in Bar Harbor will not affect public transit. All transportation vehicles have sufficient light sources to run at night without street light assistance. Improved lighting will improve the general quality of town. The town will become more cutting edge and, at the same time, more green through improvements. Though people may be interested in the installation of new lighting, most people will not desire to know the specifics behind developing new light technologies. Therefore, public education on this issue will be minimal except for dates of changes.

4.1.3.3. University:

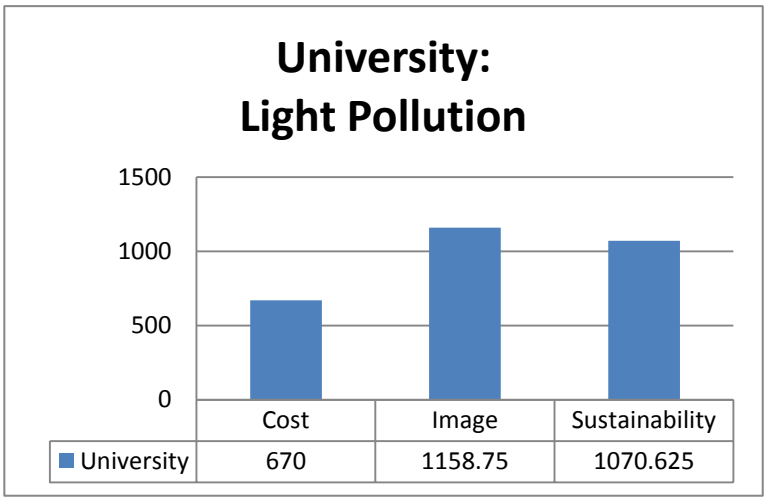

Figure 4.26

Cost for this program will remain close to that of the 2012 E Term Bar Harbor IQP cost. No special equipment is required for the observation of lighting in the center of town. A camera may prove useful when observing overnight, especially for multiple nights in a row. A main sponsor for this project would the town itself, considering much of the research will be centered on improving the quality of the center of Bar Harbor at night. A resulting project of lighting installation definitely would be sponsored by the town as well. This project would be an excellent opportunity for WPI to begin a beneficial project-based relationship with the town of Bar Harbor.

The overall goal of this project would encourage more efficient lighting for use at night, which promotes a green attitude towards life in Bar Harbor in general. The project aims to better the community as a whole through possibly more cost effective and environmentally friendly lighting. This lighting would extremely cutting edge and technologically advanced for the area, and Acadia National Park would still benefit from the change. Therefore, this idea for lighting alteration is in accord with the general attitude of environmental protection in the Bar Harbor area.

This project's main goal is to research the outdoor lighting in Bar Harbor and propose suggestions for increasing the efficiency. This goal may not be accomplished immediately, but through careful research, the town plans to reach the overall objective of more efficient and environmentally friendly lighting. More efficient lighting could attract more tourism if proper advertisement is placed on the improvements. The opportunity for renewable energy run lights is also a feasible milestone for the town lighting advancements. Renewable and efficient lighting would suppress of the growing problem of light pollution and enhance Bar Harbor's popular scenic image.

4.1.3.4. Student:

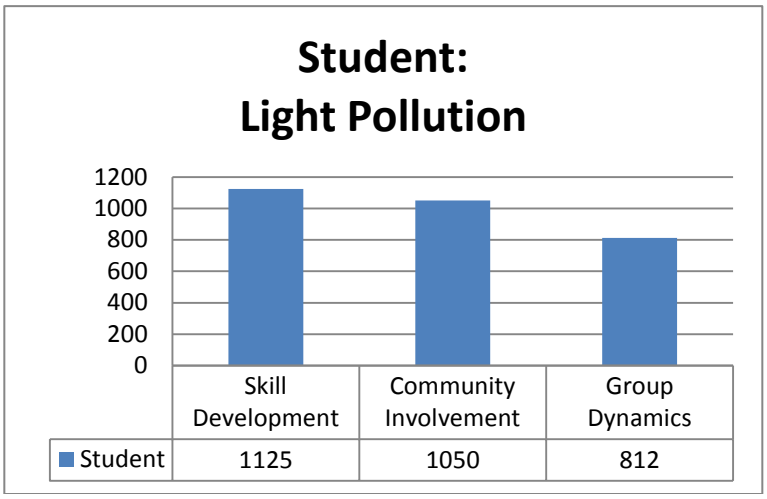

Figure 4.27

This project is not restricted to students with specific majors. Anyone can document lighting and produce results on the effects of that lighting on the surrounding environment. Programming is not required, unless certain modeling is utilized in order to facilitate the research. However, students may need to put in extra research in order to offer complete lighting suggestions for future town improvements. Future projects may need students in an area more focused on the understanding of basic lighting principles. For example, a Civil Engineer may have the advantage of knowing where to place certain lights to maximize efficiency. The organization of the report must be high when working with the town. This project will promote excellent working and organizational skills for each student.

Out of the suggested projects in this report, researching the town lighting situation is the most likely project to work with the town of Bar Harbor directly. Students have the best opportunity to meet with town officials to discuss possible solutions to town light pollution. Most actual project work will be centered in town, so students will interact with townsfolk. Students will be able to experience the culture of the area through their research and expand their knowledge beyond the scope of the project.

The information attained from this project could be valuable knowledge for any student. Understanding the effects of light pollution on the environment is a valuable proficiency in today's advancing world. Businesses and towns are searching for solutions to light pollution around the world. Any proposed solution to Bar Harbor's light pollution issue could serve as a model for other towns in the future. Quantity of data is limited for this project, but the educational worth is immense when considering the possibilities for future use.

4.1.3.5. Personal Analysis:

Currently, Bar Harbor plans to research the light pollution emitted from the center of town. The town ledger has set dealing with this important issue as a goal for the upcoming year. Therefore, collaboration with the town to participate in this project must be made soon. This project is an excellent opportunity to work with the town and develop a positive relationship. One of the goals of this project will be to help environment, which is in accord with WPI's current standing of renewable and efficient energy. The overall impact this project will have on the site, university, and student will be positive and promote progress towards a greener and more sustainable future.

4.1.4. Long Term Environmental Observations in Acadia

4.1.4.1. Overview:

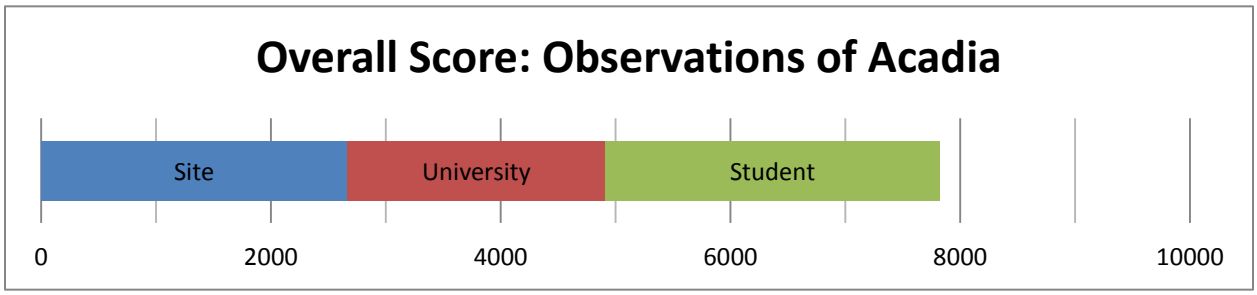

Figure 4.28

Acadia National Park is the largest contributor to the natural setting of Mt. Desert Island. The park attracts thousands of tourists in search of true environmental beauty throughout the summer months. This tourism greatly advertises the park but can also potentially harm many fragile ecosystems. This project would serve as a documentation of the park as a whole in order to fully understand the impact of tourism on the entire park. Possible results could include wildlife population models, weather data, or pollution records. This one encompassing project striving to document the entirety of the park could include the recent Trail View IQP as a major branching side project. Expansion of this project is likely, especially when considering the size of Acadia National Park and the many opportunities held inside.

4.1.4.2. Statistics:

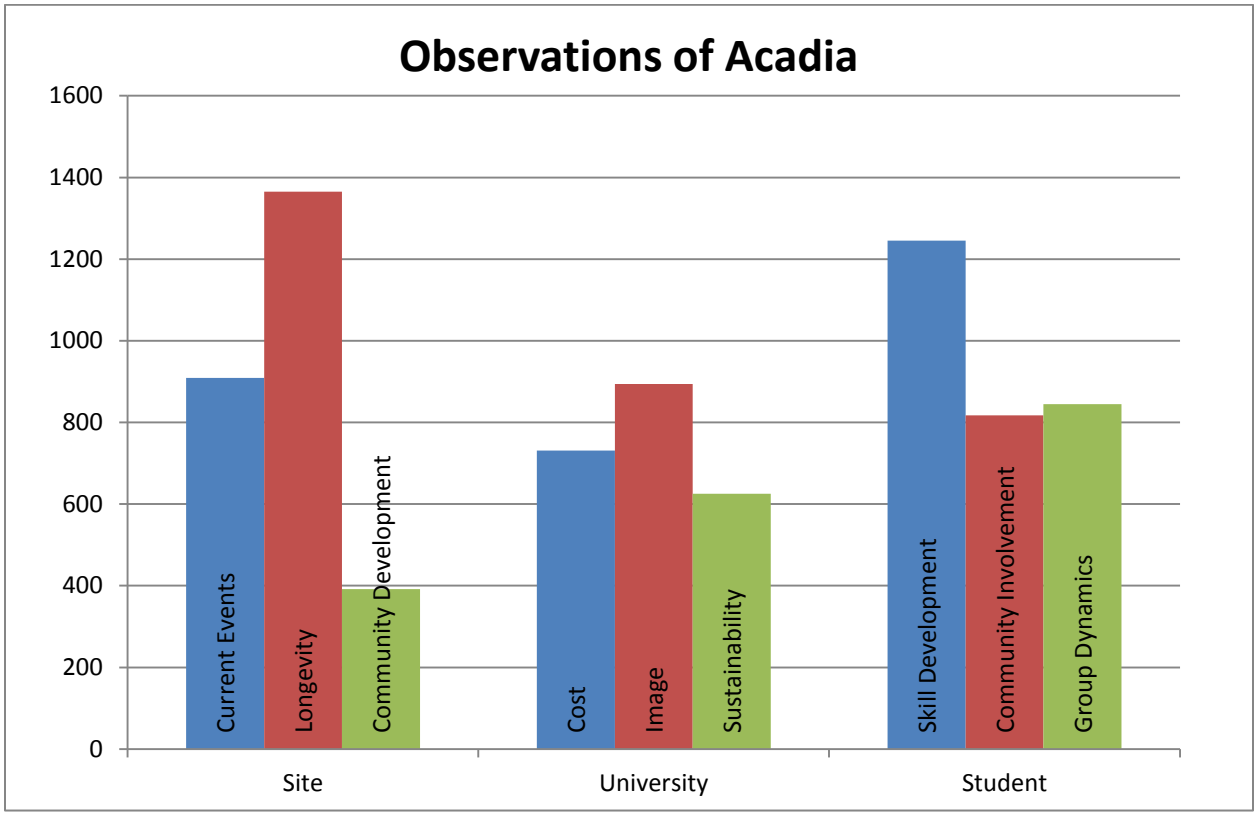

Figure 4.29

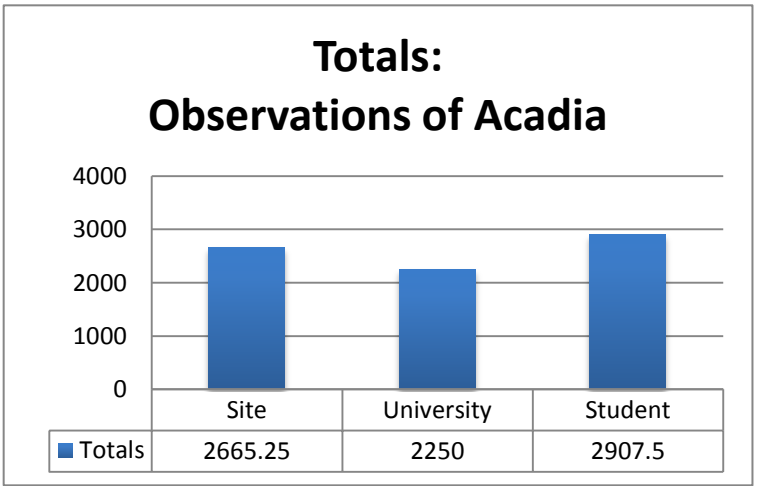

Figure 4.30

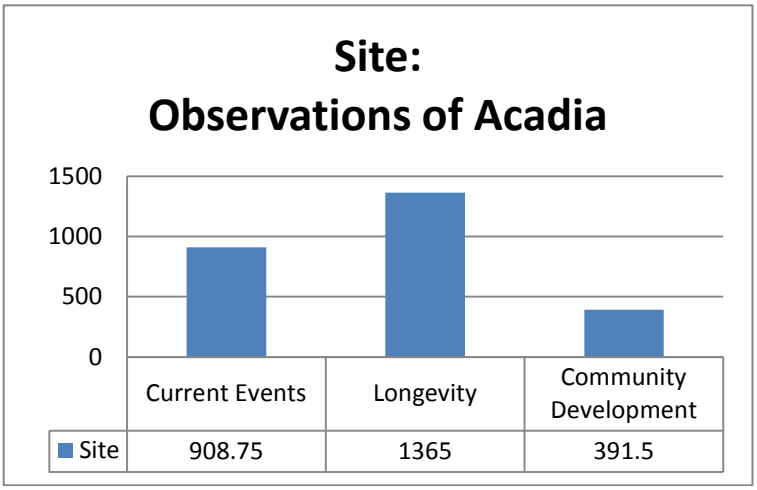

Figure 4.31

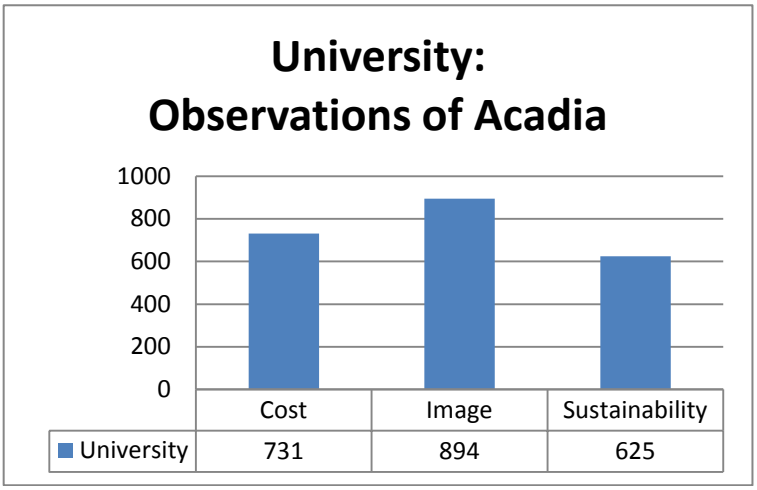

Figure 4.32

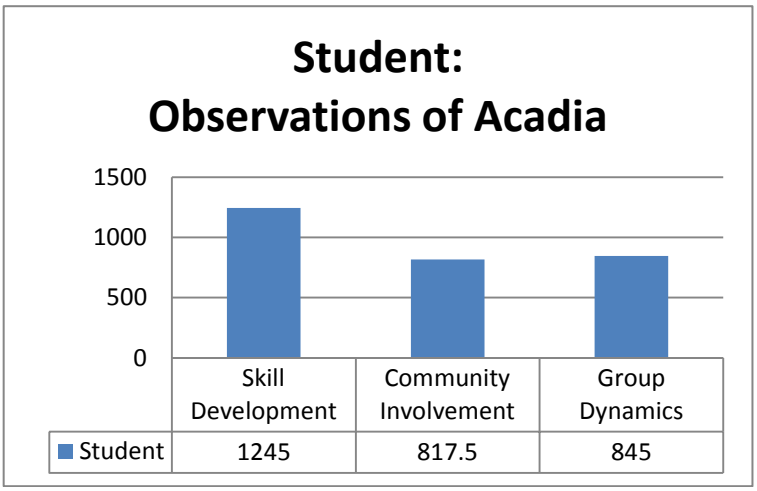

Figure 4.33

Site:

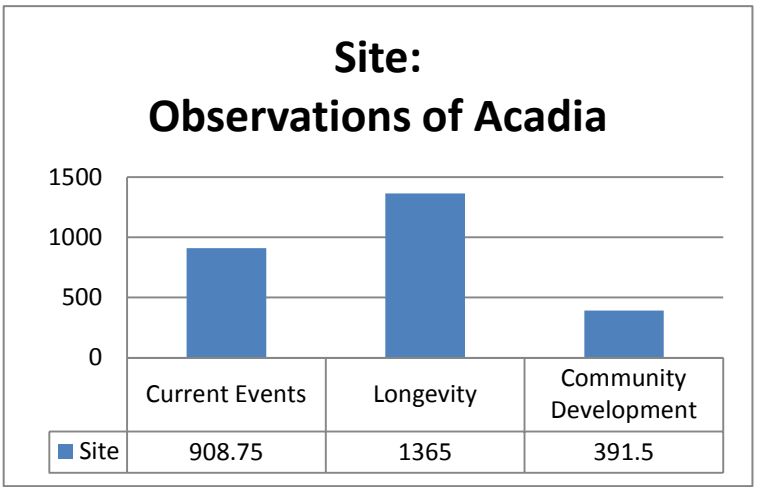

Figure 4.34

Acadia National Park, as part of the National Park Service, is a government-run organization serving to preserve the natural history and ecosystems of the complex environment of Mt. Desert Island. For this project, consistent information will not pertain to the government specifically. The information will deal mainly with the education of the general public about the conditions of the park. The park organization may choose to sponsor the project, but the government is not explicitly involved in the research portion of the project. Future projects may gain governmental attention over the current conditions of the park, but, again, the government will not expressly involve itself in the progress of the report. Businesses are not affected by the results of this project. The only involved business may include Friends of Acadia or the National Park Service, but the information gathered will not harm or help any businesses in particular. This project would serve as the ultimate environmental research opportunity for the Bar Harbor Project Center.

The most important aspect of this project will be the amount of data covered throughout the years. Every detail about the park is a possibility for research from year to year. Acadia is large enough to expand this project through the entirety of the lifetime of this project center.

Certain data can be gathered yearly for detailed analysis, while other data can be gathered in one term but still cover the basics of a proper IQP. This project will enable any project relating to Acadia National Park, which is a central focus of this project center. The amount of content this project offers sets it apart from other IQPs. Acadia presents a lifetime's worth of information in regards to the environment, which is the most important factor when considering a project for this center.

Acadia National Park completely avoids transit in most cases. The only forms of transportation seen in the park on the trails are carriages, tractors, horses, or bicycles. The majority of traffic is by foot, which helps to preserve the natural setting of the park as a whole. Roads pass through the park, but transit will not be hindered as a result of this project. Town upkeep also does not factor in to the growth of this report. Acadia is separate from the town in order to be easily maintained and conserved. Information produced from this report will be viewed as extremely interesting to the public. For example, tourists would like to know the most scenic trails or the quietest region of the park when visiting. Therefore, public education on the results of the report in the form of online websites would prove to be an extremely beneficial feature of the center.

4.1.4.3. University:

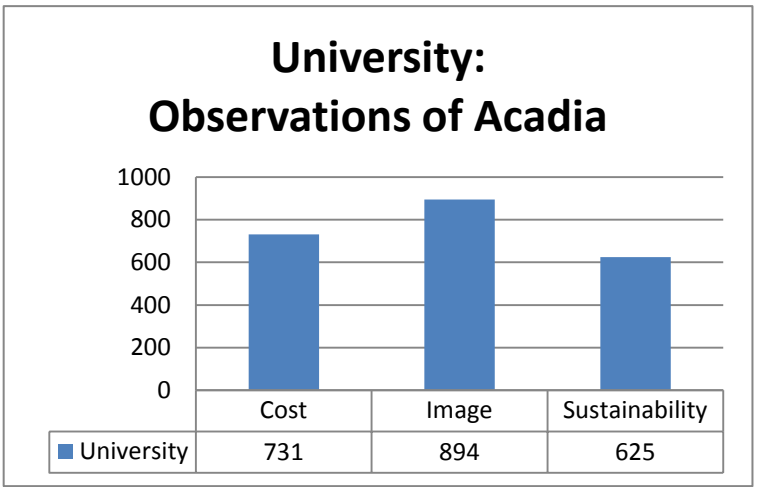

Figure 4.35

Cost of this program will vary among the chosen type of project. Some projects may require equipment in order to gather sufficient data, while others may require no external gear. The projects that necessitate equipment may cost more due to the necessity of those items. Tuition will remain similar to other E Term IQPs. The university will need to invest in this project, but likely sponsors, such as Acadia National Park and Friends of Acadia, will invest more effort if they choose to sponsor a project. The involvement of sponsors will be high compared to other projects because results will directly affect park sponsors. Most will be interested in gathering important information about the conditions of Acadia because Acadia is such an integral part of the society of Bar Harbor and the rest of Mt. Desert Island.

The image of this project highlights a green approach to new technology. However, gathering information and observing an environment only supports green technologies so much. More appropriate future projects that physically improve and benefit the park are the greenest possible projects. Some future-enabled projects resulting from this one encompassing project may demonstrate great technological advancements through innovative design improvements for the park. This project will show no direct humanitarian results, but documenting and developing

ways to improve the environmental characteristics of the park will assist people's knowledge of the wildlife of the area.

Similar to the cutting edge view of this project, the renewability will not be seen in the early stages. The initial project focusing on gathering data and documenting the condition of the park will not exhibit a renewable or efficient approach. The organization of the report may be done efficiently, but the report will not be specifically renewable or efficient. However, future projects enabled by this project will greatly encourage and present efficiency and renewability of park resources. This project will deeply benefit the park, students, and visitors of the natural sites the park has to offer.

4.1.4.4. Student:

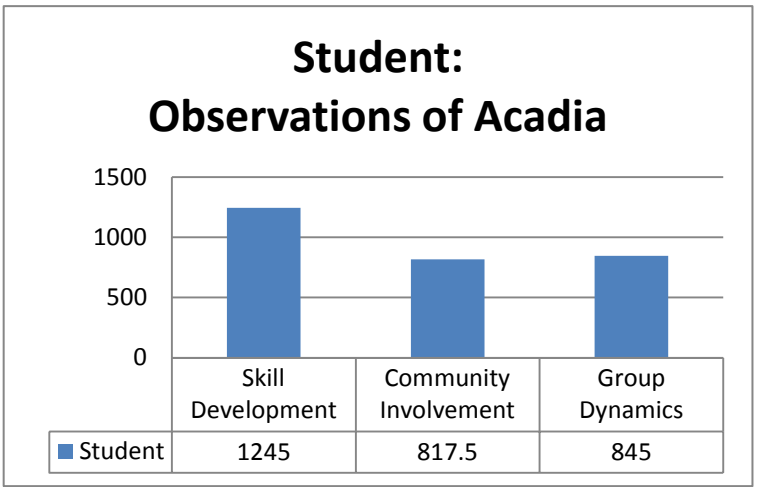

Figure 4.36

Group diversity for this project will not be limited to specific majors. Any student can document an area through measurements and pictures. Certain aspects may require a more in-depth background of some equipment or methodology, but students may overcome this learning curve through additional research and hard work. This project will require a high level of organization due to the magnitude of information covered and the importance of the data gathered. Some results may potentially be extremely useful for the Park, so students must maintain strict organization when presenting these critical results. The amount of results will be difficult to track without some form of advanced organization. An online website or storage option may be necessary for storing data for current and future use. Organization is always a key factor when creating a successful report, and this project will require exceptional managerial skills.

Students working on this project will not directly interact with people, but they will create useful information for people. People may question students in the field, but this contact will be limited. Students may converse with officials from the Park or Friends of Acadia regarding the conditions of the Park based on their results or even solutions to possible issues relating to the

Park. Non-WPI interaction may be limited, but students must be open to the possibility of expressing their work to the public and explain the importance of Acadia National Park to this island.

The information gathered throughout the entirety of this project is essential knowledge for Acadia National Park. Any data regarding the wellbeing of the wildlife of the area is valued highly by Park officials. Park organizations will greatly appreciate suggestions on how to improve environmental conditions in the Park or just the Park in general. Students will gain an understanding of the natural area in which they will be working. Learning about these complex environments is valuable knowledge for any person. The quantity of data possible to collect is exceptional due to this project's great likelihood for expansion and for enabling other future projects. Quality reports discussing the conditions of Acadia National Park and ideas for integrating technology safely will prove to be essential for the Park in the future.

4.1.4.5. Personal Analysis:

The possibilities for expansion from this project are incredible. This project is the perfect form of work for the Bar Harbor Project Center. A fundamental focus of the Bar Harbor Project Center is Acadia National Park, and this project both works in and benefits this exact focus. Students will appreciate the importance of National Parks to the environment and understand why such effort must be placed into maintaining these complex but essential areas of the world. This project has the ability to last the entirety of the lifetime of this project center and expand into dozens of interesting projects. This project is as green as a WPI project could get and fits WPI's current concentration on sustainability and efficiency. The overall value of this project would greatly boost the already innovative and advantageous reputation of WPI IQPs.

4.1.5. Shoreline Quality Due to Boating Traffic

4.1.5.1. Overview:

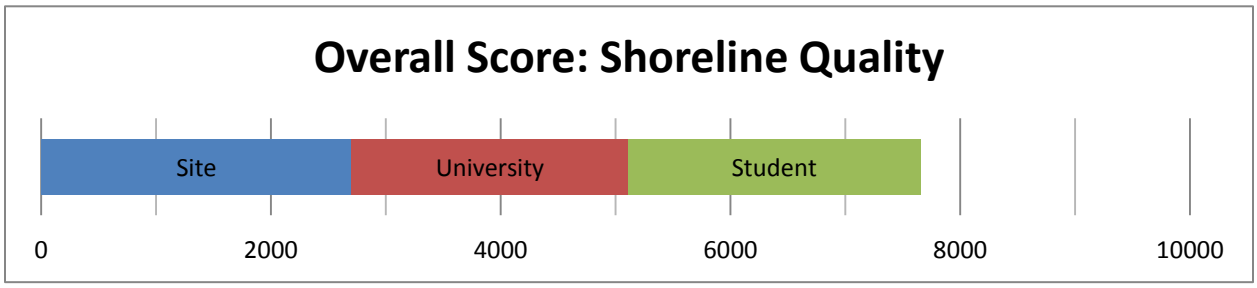

Figure 4.37

The purpose of this project will be to research and analyze the effects of boating traffic on the shorelines of Bar Harbor, Maine. Similar to the detrimental effects of large boating vessels on the canals of Venice, large commercial vessels and many smaller boats travel through Bar Harbor's Frenchman Bay daily, causing unwanted wakes that, over time, disturb the fragile shorelines of the harbor. This project will examine exactly how much boating traffic damages the shorelines through the use of photographic documentation over time and research on past and present boating traffic. Students will first learn the amount of boats traveling in and out of the harbor in a given time period and then document the conditions of specific locations along the shorelines while looking for any variations in quality. The students can generate a final evaluation on the effects of boating traffic on the shoreline in a given period of time, or they can compare the boating traffic during two different times of the year, depending on the availability of A and E term projects. This project could continue over the years researching the effects of boating traffic, which could result in another project of suggesting ease of boating traffic possibilities. This project will be extremely useful for the benefit of the town and preservation of the shorelines.

4.1.5.2. Statistics:

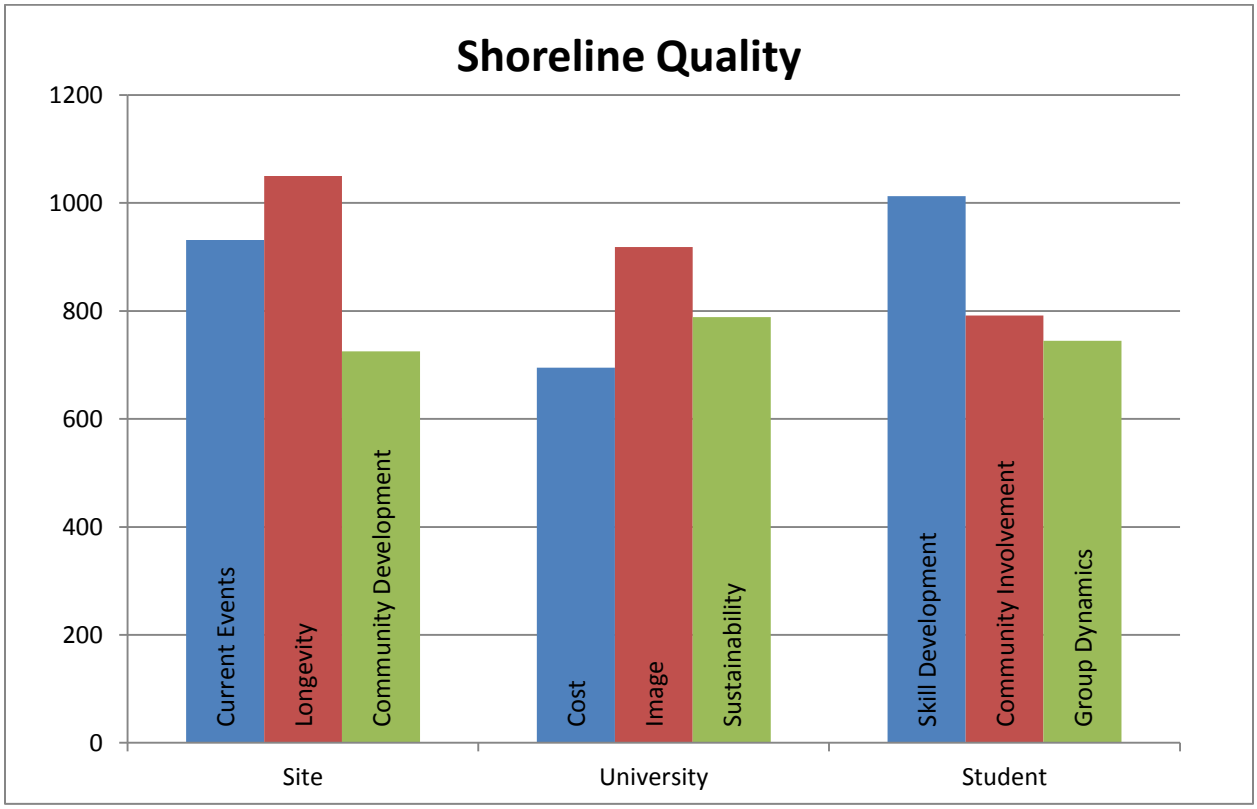

Figure 4.38

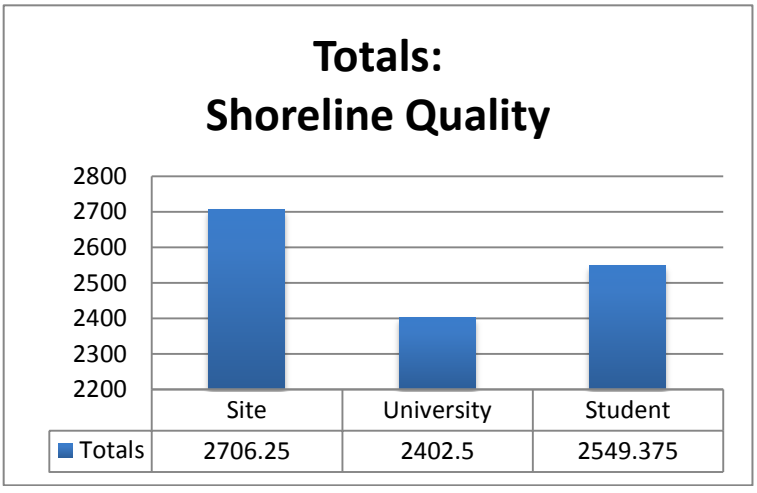

Figure 4.39

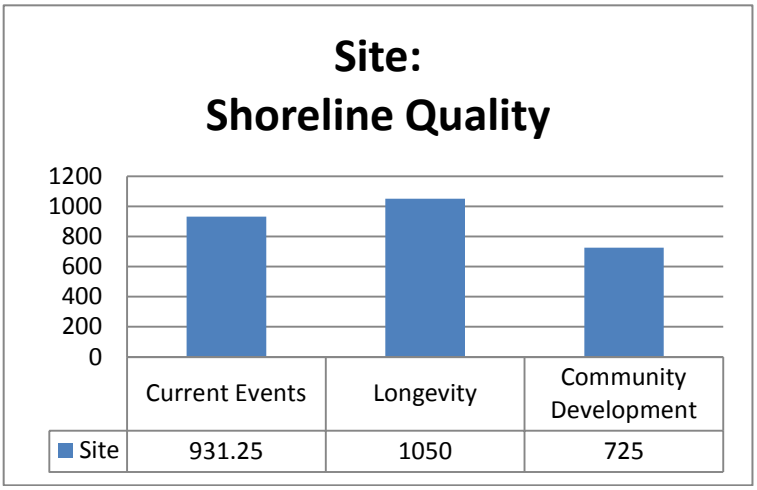

Figure 4.40

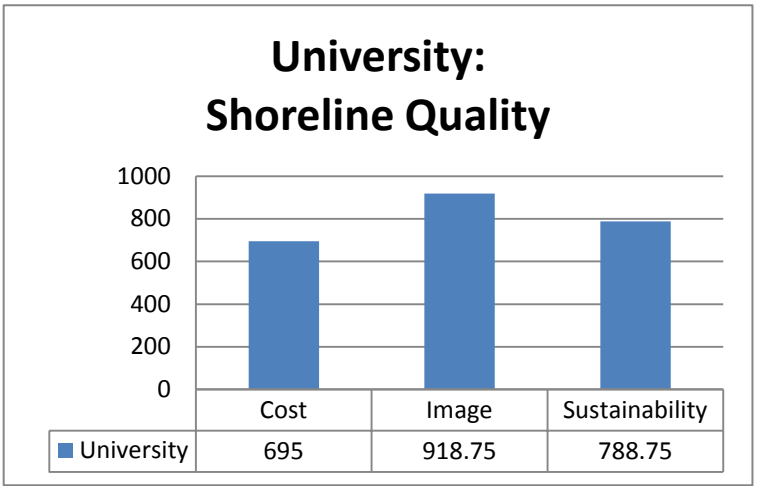

Figure 4.41

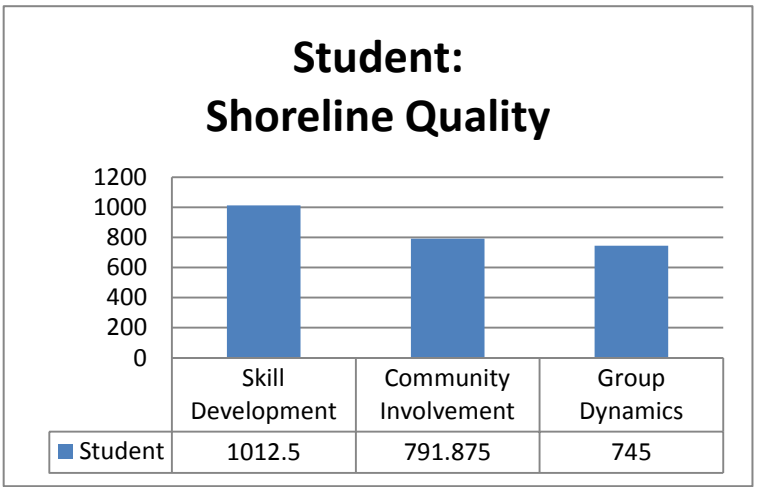

Figure 4.42

Site:

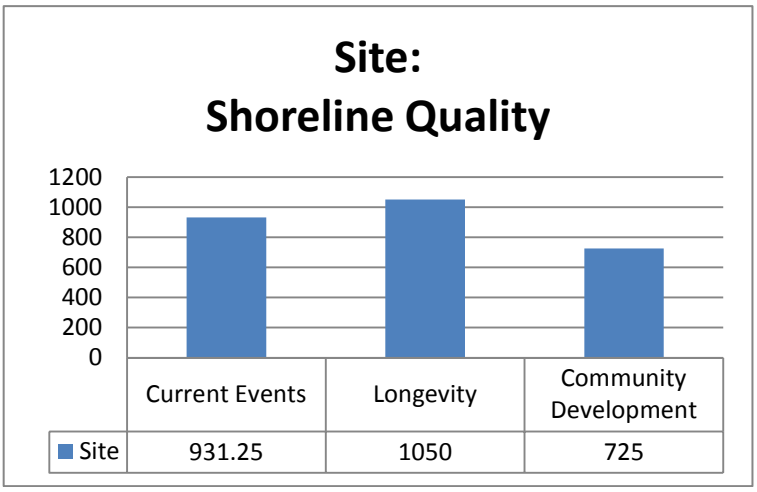

Figure 4.43

Boating traffic involves many businesses, including public transportation services, oil shipping, and fishing. Any new restrictions to boating traffic would directly affect these businesses, and this project could potentially suggest restricting boating traffic. Businesses would, therefore, need to know exactly what these restrictions would be from day to day. The general public would benefit from knowing the progress and results of this project because changes in boating traffic could alter some maritime transportation services. Deteriorations in shoreline quality could also detract people from touring the area. The government must pay attention to this possible issue in order to continue sufficient levels of tourism. Depreciated shoreline directly affects the environment of the area and may affect the general attitude toward the natural beauty of the island, which is a major reason for tourism.

This project could provide a vast amount of content documenting the conditions of the coastline of Bar Harbor. The report would not be restricted to the Bar Harbor area, but could extend around the island. Other information, including water temperature data, bacteria count, pH levels, and noise, could be gathered for general information about the coastline of Mt. Desert Island. This information could begin new projects pertaining to maintaining or documenting the

coastline or developing methods of improved boating traffic. The expandability of this project is high, especially when considering the amount of shoreline and its many enabling aspects.

Any alterations in boating traffic this report could suggest would affect boating transit, which could potentially harm tourism. Restrictions in boating traffic may increase in price or delay, which could turn people away from using boating services. Town upkeep is also an important aspect of Bar Harbor. The town must keep the overall appearance of the town agreeable to the public in order to attract tourists, and the shoreline is an important characteristic of the appearance of the town. Therefore, evaluations of the current status of the coastline could prove to be extremely important for the aesthetics of the town. The overall educational value for the general public would not be very high for this project, but the other projects that could result would provide worthwhile information in regards to shoreline quality and suggestions for improvement.

4.1.5.3. University:

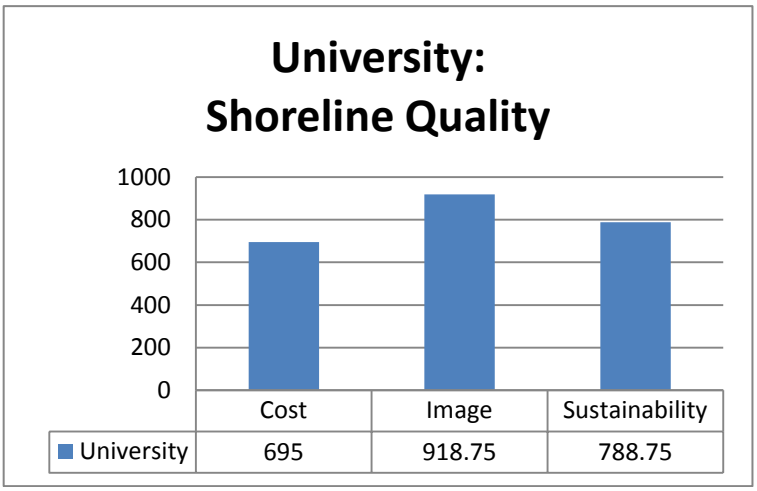

Figure 4.44

Cost for this program would compare closely to the 2012 E Term Bar Harbor project. Tuition may increase from the change of year, but other expenses would remain low, keeping this project reasonably priced. This project would serve more as an analysis of shoreline quality with suggestions to problems and would focus less on actually mediating the issues. Extra cost for equipment may factor in, but cost will be minimal. Therefore, overall expense would be practical when compared to other E Term IQPs. The university would not need to invest highly in this project because it is mainly student progressed. Students will gather information and report on that information. The town may choose to sponsor this project in order to easily communicate thoughts on shoreline conditions, but the majority of this project will be gathering and documenting data. Suggestions for future projects could be made as an appendix.

The image of this project will greatly reside as green due to the certain natural characteristic of the Mt. Desert Island shoreline. Since the majority of this undertaking would be simply gathering data, an image cannot thoroughly be created. There would be no true humanitarian aspect to this report, and only suggested projects could offer a cutting-edge appearance. However, the coastline is part of the environment of Bar Harbor, so this project will

have a reasonably green image. The shoreline is an essential factor of the natural beauty of Bar Harbor, and offering suggestions on maintaining this important part of the town is an excellent opportunity.

Future projects resulting from the suggestions of this project could provide renewable options to boating traffic and shoreline upkeep, but this report specifically does not offer renewable findings. Some features of the shoreline could be altered in order to promote renewability, but these would be findings of this report, not results. Similarly, this report will only promote efficiency of boating traffic; the overall results will not contribute to the efficiency of the boating traffic around the island. Future projects, however, will be extremely focused towards this goal of efficiency.

4.1.5.4. Student:

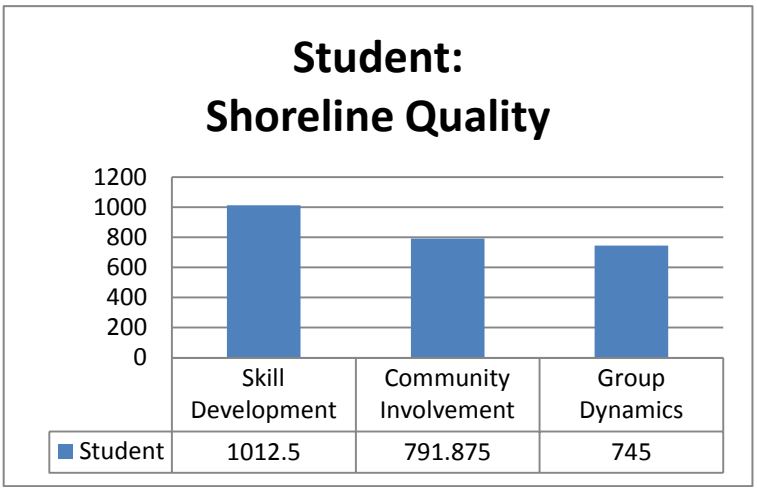

Figure 4.45

Student diversity will be close to average for this project. Much of the research will deal with the specifics of complex boating laws, boating traffic, and biological features. Students must gain a sufficient background in the project material before engaging completely in the analysis. The potential research will require an adept skill in environmental analysis and understanding of certain equipment. Students must also remain reasonably organized for the entirety of this project because they could potentially be working with the town. Organization is a great skill to have in general, and this project would promote improvement of organizational abilities.

The students working on this project will not interact directly with the public but may consult with some town officials due to the specifics of the undertaking. The town will appreciate collaboration through meetings discussing the current situation of the shoreline if sufficient data were to suggest significant circumstances. Students may interact with boaters for a better understanding of boating traffic around Bar Harbor. The majority of this project will involve outdoor environmental data collection with minimal non-WPI interaction.

The educational value of this data could be extremely valuable for the town in regards to

sustaining its natural appearance. Students could gain an understanding of the biology of shoreline ecosystems and how they are affected by modern boating traffic. Gathering data will require understanding of certain equipment and will require sufficient methods of organization. Students will be able to produce an overall result about the current situation of the shoreline surrounding Bar Harbor. This project will potentially provide a reasonable amount of quality data. The information gathered will be more important for the town than for the student, but the student will come out of this project more knowledgeable.

4.1.5.5. Personal Analysis:

This project will make a decent IQP, but students may need to be slightly specialized in their major or at least put in extra time for pre-IQP research. This project would require detailed understanding of some marine equipment and the many aspects of boating. Students would also need to be willing to meet with town officials to discuss important topics, such as boating laws, if the situation were to present itself. An IQP project of this nature would be feasible over multiple years of work. The amount of information needed to produce a final result would be relatively large, similar to the Bar Harbor Trail View Project. The information would be beneficial for the town even if the results were inconclusive in regards to the effect of boating traffic on the shoreline. Other data could still be gathered around the coast of the island for the general use of the public. People may like to know the warmest water locations along the coast or the generally cleanest areas, for example. This IQP could enable other projects for researching this data and gathering other lesser-known but still significant information about the island.

4.1.6. Sound Design Continued

4.1.6.1. Overview:

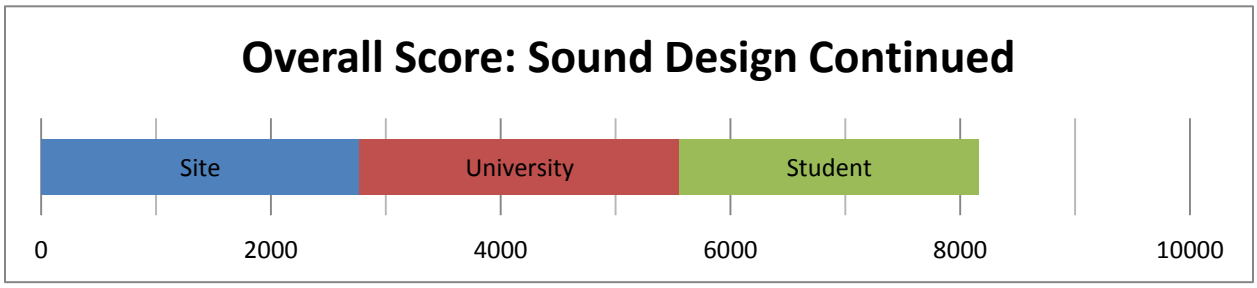

Figure 4.46

The current Bar Harbor Sound Design Project surveys parts of Acadia National Park and other areas for proper testing locations. The group then performs various sound tests that document and analyze the acoustics of those specific soundscapes, which are the areas of interest. These results can enable future projects for developing environmental orchestras. Environmental orchestras are extremely fascinating devices that use their natural surroundings to amplify or enhance sound and create symphony-hall-like effects. Students in future projects could either expand the tested areas or begin designing these environmental orchestras. The educational value for these possible reports would be incredibly high for WPI students.

4.1.6.2. Statistics:

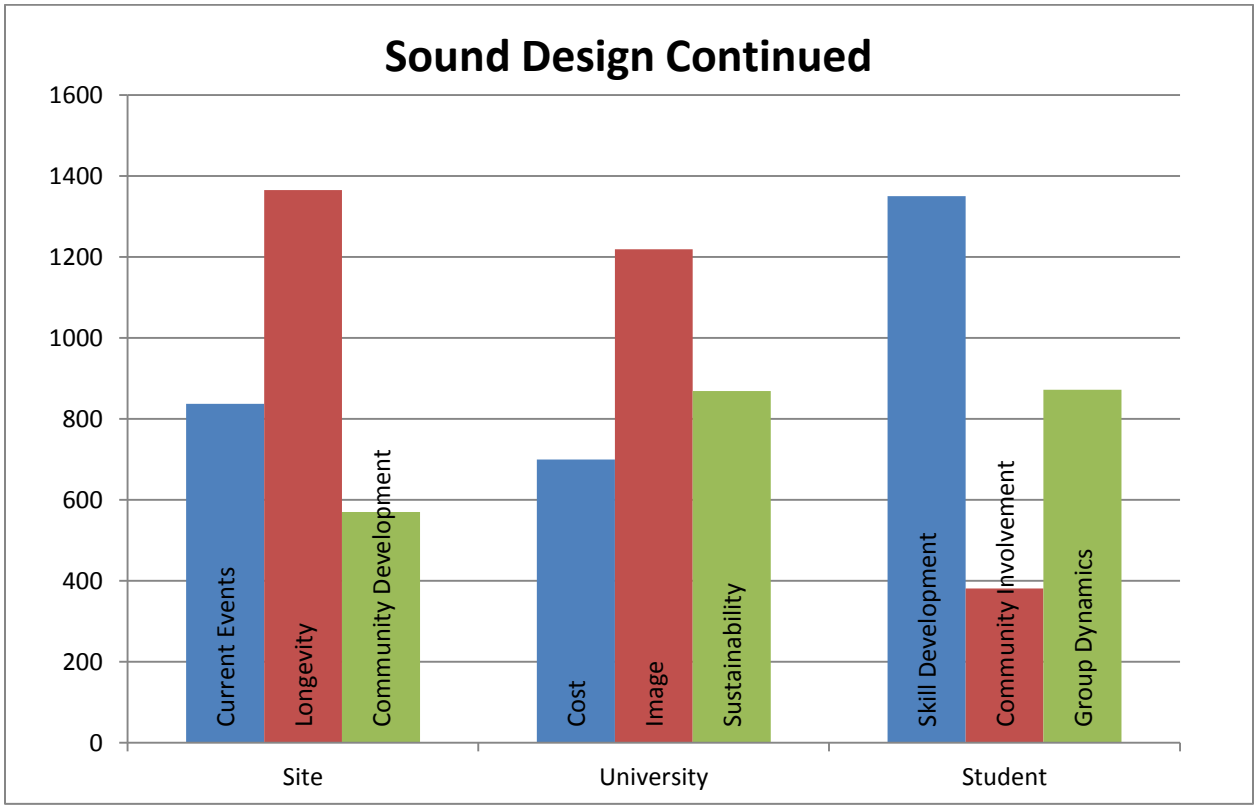

Figure 4.47

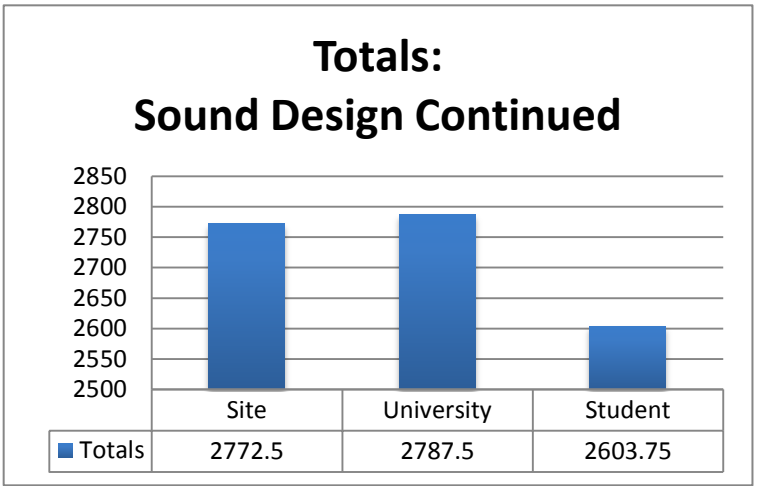

Figure 4.48

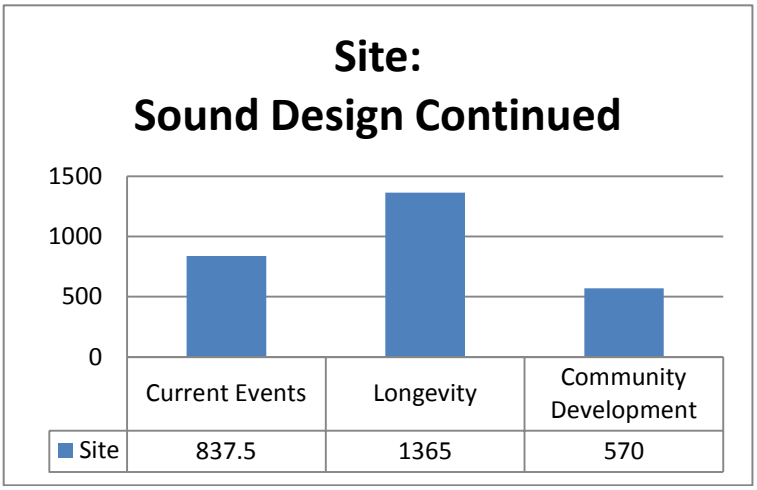

Figure 4.49

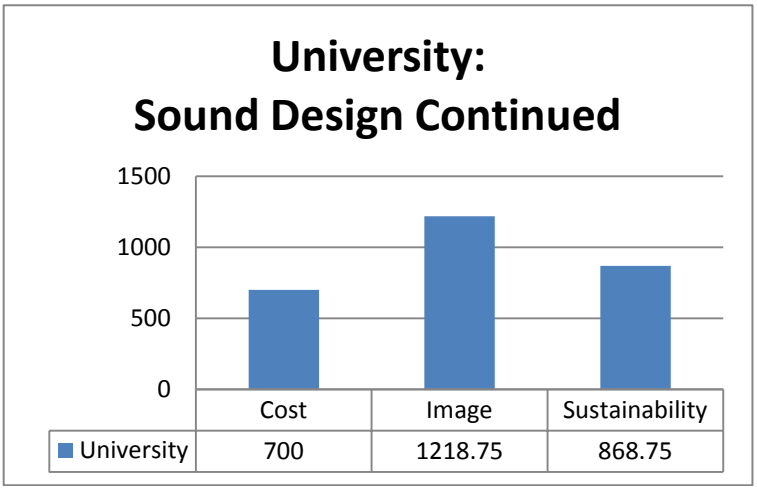

Figure 4.50

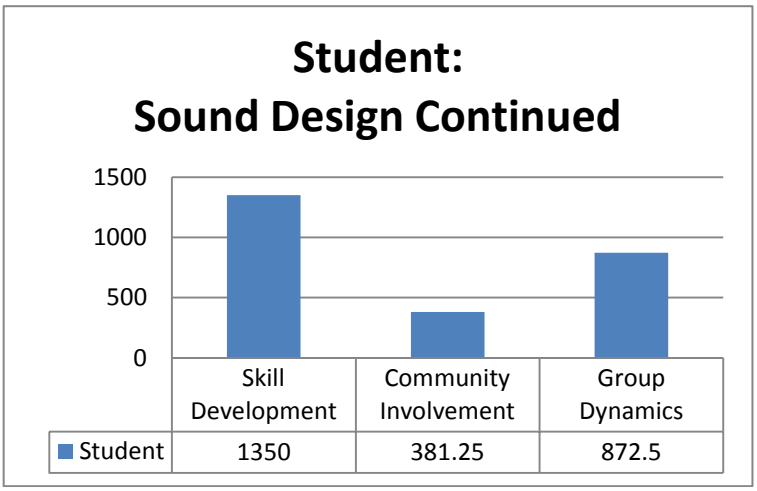

Figure 4.51

Site:

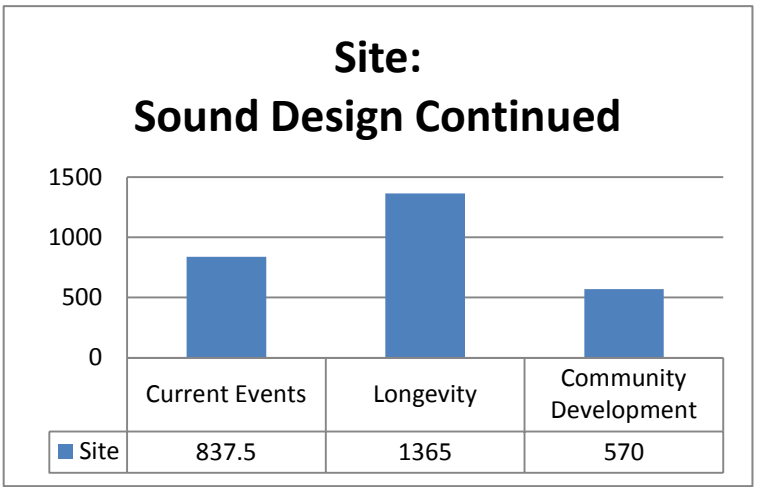

Figure 4.52

A project analyzing the sound tendencies of specific locations throughout much of Acadia National Park will benefit the site in many ways. Specifically, the project can address many current event issues, specifically relating to the environment and education. Students will analyze the acoustics of the environment and develop environmental tools for sound development. This research has extreme environmental educational values for the site. People will be attracted to new, creative soundscapes throughout the park and will learn about the complexities of sound in nature. This project is not as pertinent to business or governments, but collaborations with the city or park will certainly be important for the future development of the project.

The longevity of this project will be one of the most important factors when compared to other projects. This project will allow for future project of the same purpose or of similar design to be created due to the broadness of the project material. This exact project can be expanded year after year until the entire acoustics of the National Park are mapped. Variations of this sound project researching environmental orchestras will be a main consideration when developing other similar expandable projects. The amount of material this project covers is vast enough to continue for years and important enough to be worth continuing for years.

All projects must provide a certain degree of community development in order to be considered as a legitimate possibility. The Sound Design Project not only provides tremendous educational value for the student, but also for the community at large. The information gathered from this experiment will be available to the general public, not restricting the educational value of the material. Both tourists and permanent residents will benefit greatly from the knowledge presented by this project for years to come. This project does not directly affect transit or town upkeep, but the research can be used to develop improvements for park services. Similar research methods can also be used in or around the center of town in order to create natural sound attractions for the general public. These innovations will both educate the general public and add cultural value to the encompassing area of Bar Harbor.

4.1.6.3. University:

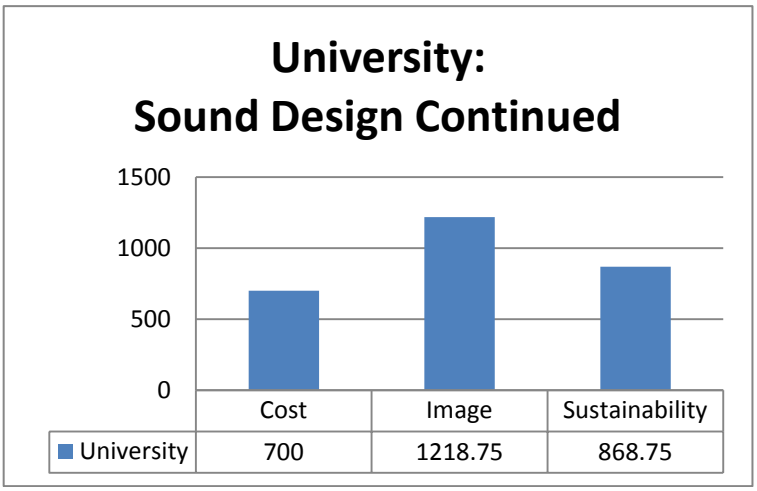

Figure 4.53

The Continuation of the Sound Design project of 2012 has the opportunity to benefit the university, but at some cost. The project work requires some equipment such and microphones, air horns, air compressors, speakers, and software for analysis, and therefore, without a sponsor, the project poses some impact to tuition and investment. Despite this, the work is likely to be sponsored due to its potential influence on the attraction created by environmental sound sculptures to the Bar Harbor region.

This project aims to improve human enjoyment in the park through a musical installation, thus, the project holds quite well in terms of its humanitarian impact. The image portrayed by this project, on top of its humanitarian impact, is one of cutting edge advancement into environmental sound sculptures. Despite being cutting edge, the project has no true benefit to the implementation of green technologies. This balance of positive and neutral impacts on the university's public image results in an overall positive impact on the university assessment as a whole.

With regard to sustainability, this project does not hold quite as well as some other projects. Since the project is focusing on acoustics, and artistic implementation of sound arrays

in nature, the project work leaves little room to include the use of renewable energy. The project does not outright promote efficiency; however, the design of the environmental orchestra will make use of the data collect to use the least amount of energy when doing sound demonstrations. For this reason, the efficiency and renewability scores are only scored moderately above the baseline scores.

4.1.6.4. Student:

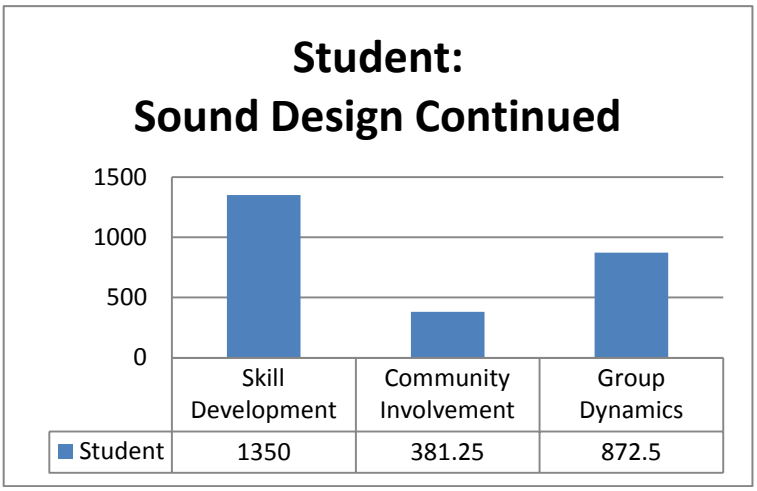

Figure 4.54

Student:

This project is very suitable for a student looking for an IQP. Explicitly, the project provides suitable group dynamics for interaction between students of varying disciplines; it can also be involved with the community of Bar Harbor, and provides a large amount of skill development in an area that is not covered well by current scientific research.

The project requires a number of different diverse skillsets in order to accomplish its goal. Knowledge of speaker enclosure design and amplifier selection is needed to ensure that the equipment used is constructed properly and is maintained in working condition throughout the project. A member with experience with programs that can utilize a microphone to measure frequency response of a system and comprehend what the resulting data means is also required for successful completion of the project. The group will also require a member that can correlate the information given from the other members and integrate it into a single completed idea for presentation to people not associated with the project. Therefore, this project is limited to students with some experience in the areas of audio design. With the amount of diverse knowledge required to complete the project, organizational skills will be key to ensuring all of

data is correlated properly.

The project could involve some student interaction with the community on site. The local government could be interested in the acoustic properties of some landscapes in order to create more informed local sound ordinances. Alternatively, some organizations in Acadia National Park who are interested in creating an environmental orchestra could become involved at this point in the project and assist with project work or point out area that they are specifically interested in. However, these possibilities rely a lot on interest about the project from outsides entities, and the project could be completed successfully without interaction with them at all. Therefore, although the group can choose to try and reach out to the community, the ratings are scored poorly to reflect that it might not be possible at all.

The educational value of the work involved in the project is extremely high. A relatively large number of technologically oriented students believe themselves to be experts of sorts in the fields of acoustics and sound systems. This project requires students to actively engage themselves in these fields, and most that experience this transition are surprised at just how much more there is to sound design than they originally thought. Students are required to understand or shall learn about frequency analysis, frequency detection with regards to the human ear, acoustic waves in space, geometric and material considerations with sound design enclosures and listening environments, scientific measurement of sound, and much more. Additionally, there is so much to know about the subject in question that there shall be a vast quantity of information gathered. The data gathered doesn't exist anywhere else, making it valuable if the group can ensure that the measurements accurate enough to provide adequate quality.

4.1.6.5. Personal Analysis:

Compared to other potential projects, the continuation of Bar Harbor Sound Design scored in the middle of the ranking system. The current project focuses on gathering data about specific areas for future use. Future projects would either continue to gather data or use the data to create environmental orchestras. Potentially, environmental orchestras could harm the environment. Depending on the type of sound emitted from the design, certain ecosystems may be disrupted by the loud noises. Therefore, the continuation of this project scores poorly. However, environmental harm caused by these environmental orchestras is not a certainty. The future continuation of this project still has excellent educational value for students and may benefit the town of Bar Harbor greatly. More research into the possible effects these environmental orchestras could have on the area specific to Acadia National Park should be done before rushing into the possible designs.

4.1.7. Merging Technology with Local Libraries and Museums

4.1.7.1. Overview:

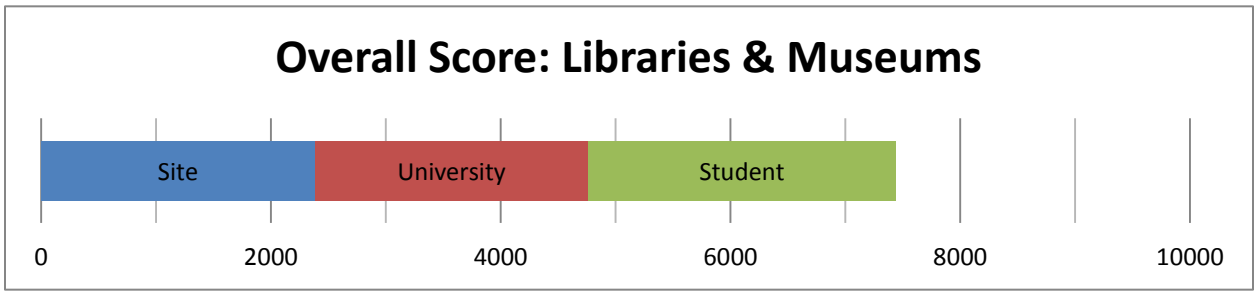

Figure 4.55

The libraries near Bar Harbor supply excellent content for their users; however, their method of organization can make navigation for particular items difficult. WPI students could improve content organization by creating an online database for each item and that item's location. Students could research ways of enhancing physical organization in the building to assist people in locating specific articles. The libraries in the area also have under-developed websites. WPI students could improve their websites and insert an organizational database of the library's content so the website will appeal more to the public.

Museums in the Bar Harbor area have similar issues in regards to their websites and organization. Similar projects where students organize and archive museum objects are possible. Each project should greatly improve library and museum appearance in the community and may assist in attracting customers.

4.1.7.2. Statistics:

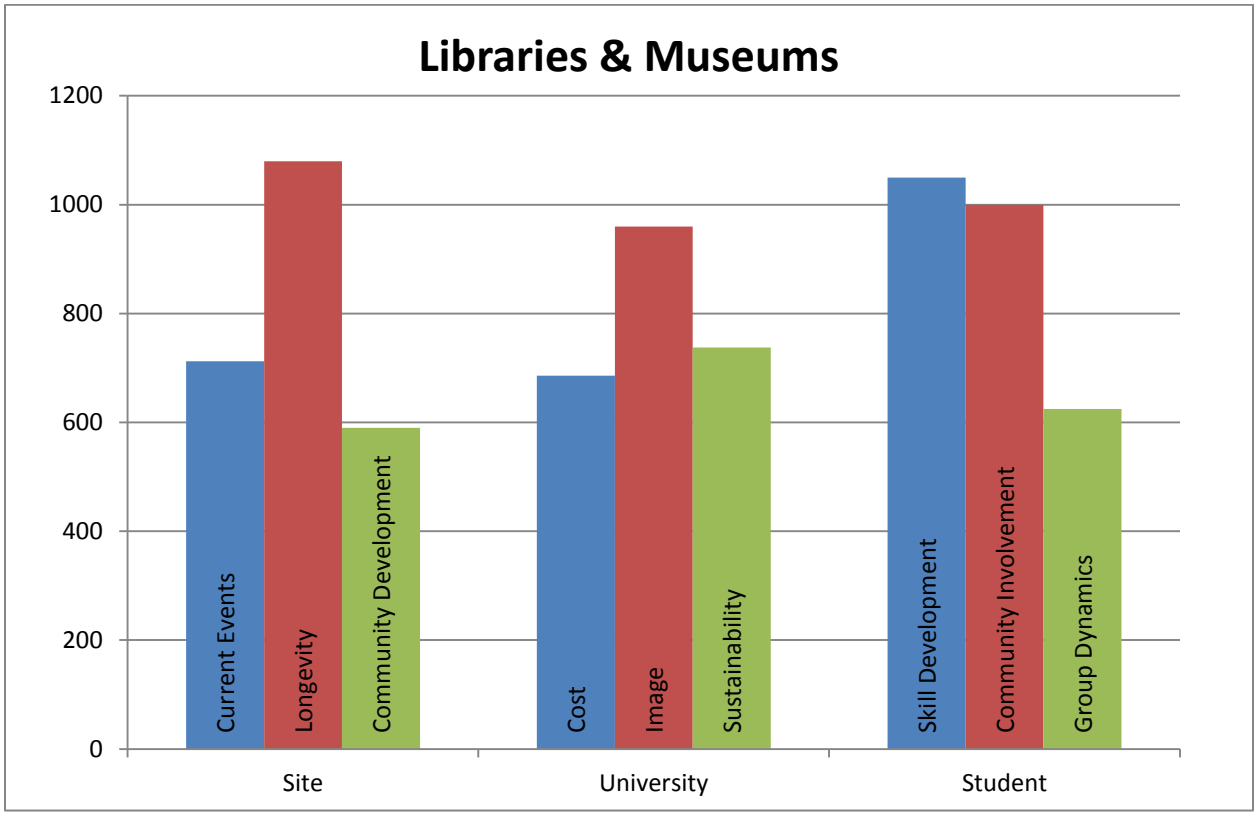

Figure 4.56

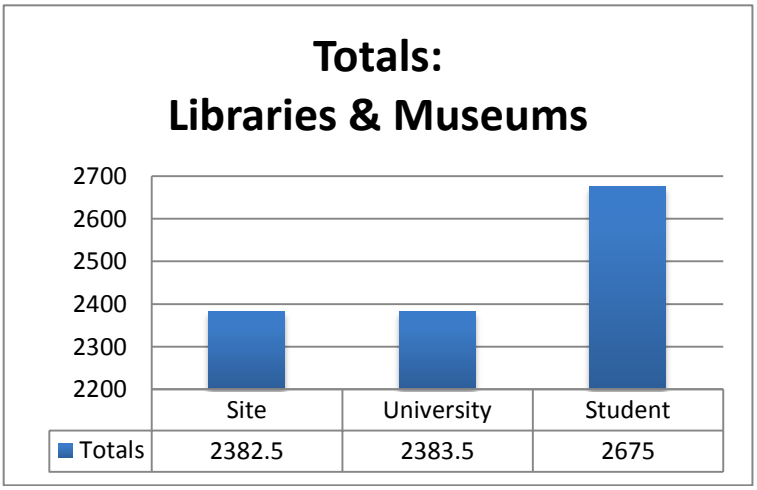

Figure 4.57

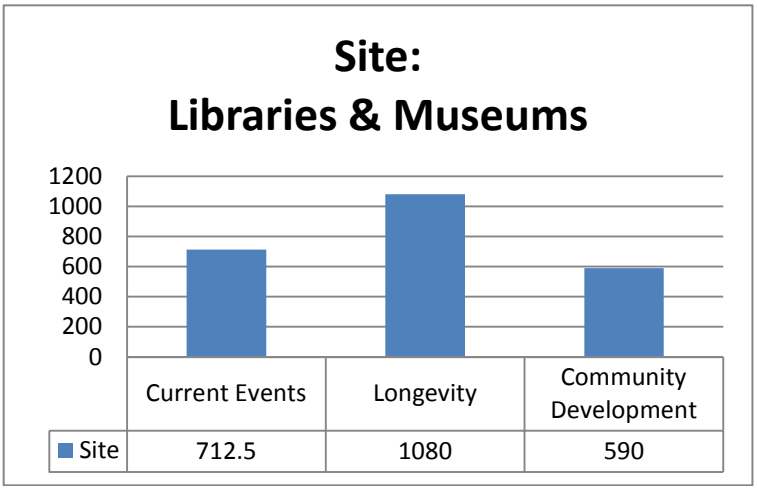

Figure 4.58

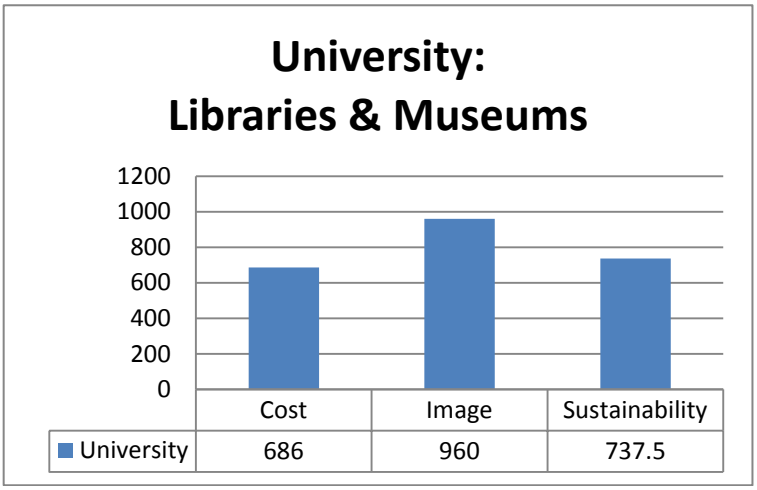

Figure 4.59

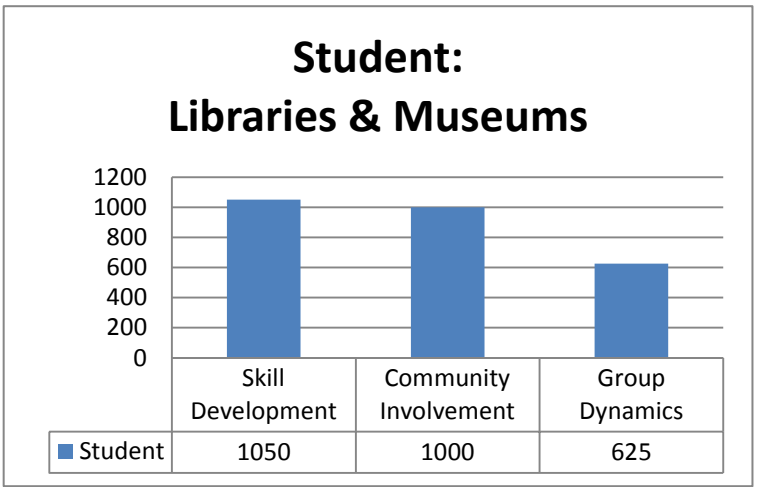

Figure 4.60

Site:

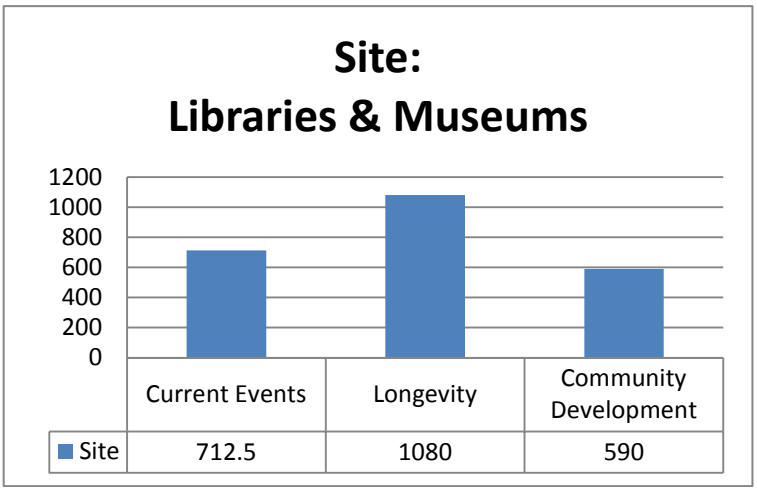

Figure 4.61

Libraries and museums are essential components for a community highly based on culture and diversity. The organizations themselves are businesses, although many are non-profit. These organizations would appreciate improvements in their methods of organization and presentment of material if these alterations would improve business. Education on the changes of these organizations would be important because residents would be attracted to the idea of improvements and would like to visit the sites in person to view the modifications. Government involvement in these issues would be minimal, but the businesses are often government-run and the government would want to know of any improvements to possible tourist attractions. Improvements to libraries would not directly affect the environment, but extra tourisms could disrupt the environment of the area slightly.

The initial project analyzing the possibilities of improving the quality of these libraries and museums would have sufficient content for a single project. However, this project would gather enough information to create multiple ongoing projects that serve to advance and modernize these organizations. Enabled projects could consist of creating databases, physically organizing the organization, or improving websites. Projects involving website organization or

archiving could expand past one year, extending the longevity of the project site.

Potential projects with these organizations could directly affect transit in a negative fashion. Increased tourism could worsen traffic and slow transit in the area. Actual improvements to these organizations would specifically relate to town upkeep. Physical repairs or additions to the building or website would improve town appearance. Residents may be interested in learning the background of what went into progressing these businesses. Additions to library or museum content could increase educational worth for both students and residents.

4.1.7.3. University:

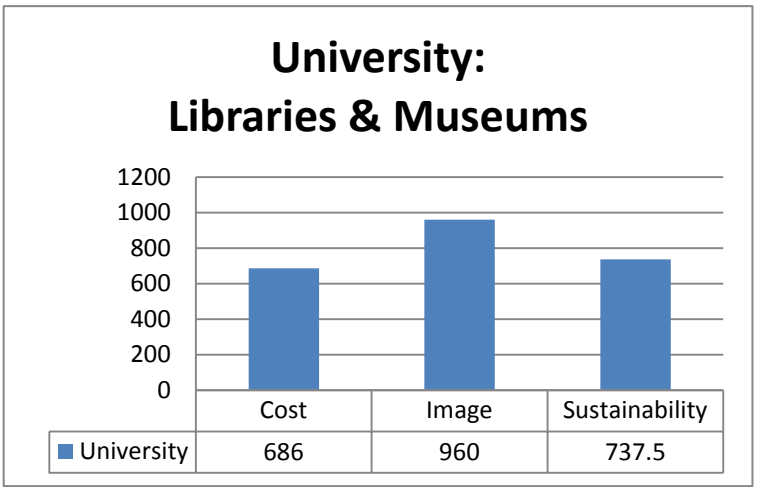

Figure 4.62

Cost for this project or any potential resulting projects will remain low compared to other possible projects. Students would not need to purchase any supplementary equipment or travel to distant locations. The university's investment would stay minimal because the project work would be completely student-progressed. The university may not need to heavily sponsor any resulting projects because the library or museum would be inclined to sponsor the projects, considering the projects would all take place in and for the organizations. Overall investment and cost for the school will be low because projects will simply amplify what already exists or add simple features for enhanced organization and viewing.

Working for the betterment of community-based businesses will create an excellent image for the university. Libraries and Museums exist for the expansion of human knowledge. Therefore, improving these businesses would create a largely humanitarian image. Some aspects of potential projects could include cutting-edge improvements for the organizations, which would enhance WPI's technologically advancing reputation. Potential projects would not directly create a green image because no part of improving a library or museum will directly affect the

preservation of the environment. Some outcomes may increase the general public's knowledge about the environment of the area, but the project will not actively promote a green image.

The overall purpose of this project and potential future enabled projects will be to increase the efficiency of these organizations. Improving online websites and creating databases to organize the storage of items will greatly improve site efficiency. Customers would be able to locate items more quickly and easily, and appearance would be neater. Potential projects would not necessarily deal with renewability because most goals could be completed only once and used for future benefit. Therefore, efficiency of use would be enhanced, rather than renewability.

4.1.7.4. Student:

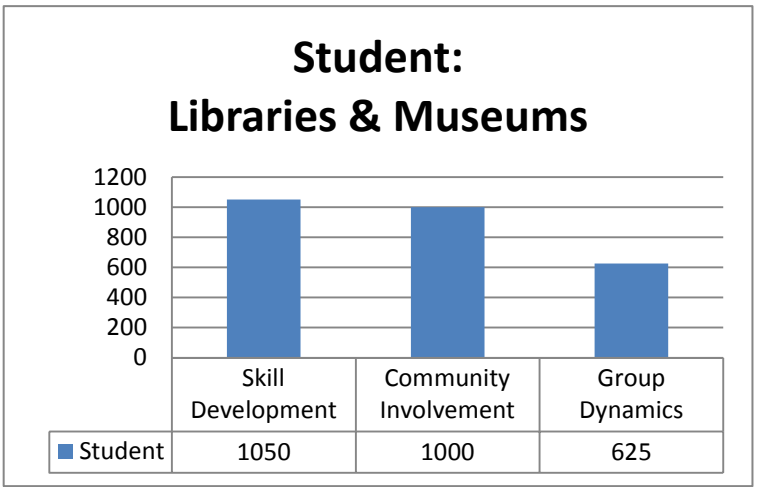

Figure 4.63

Many projects resulting from an attempt to merge technology with local libraries and museums will involve some sort of programming aspect. Students will need to be able to organize large amounts of data either physically or online. Creating databases required some level of skill in programming and high levels of organization. Student diversity in some of these projects may, accordingly, be limited to specific majors. However, some projects may be able to focus more on promoting and advertising the history of these organizations. Student diversity for these possible projects would not be as limited. Students for either type of project would need to be extremely organized at all times because they would be dealing with a large amount of information in a short period of time.

Students participating in these possible projects would experience high levels of community involvement. Students would be interacting with the library and museum owners and employees in an effort to improve community presence. Some projects may involve interaction with residents in order to gather information as to what could be improved in these highly cultural and informational organizations. Projects will not as likely involve government input, but interaction with business official may remain high.

Students working on these potential projects would become highly educated on the culture and history of the Bar Harbor area. Therefore, the educational value of the presented material would be relatively high. Students would gain a better understanding the environment in which they will be living. Students would also develop excellent organizational skills if not already possessing them. The quality of data for the student would be extremely important for understanding the local community, but not as useful in developing their major. The quantity of data would be exceedingly large due to the amount of information libraries and museums have to offer. Organizing and archiving this data may take years to do correctly, but the organizations would benefit in the long run.

4.1.7.5. Personal Analysis:

The potential for projects collaborating with libraries and museums is high. Many of these organizations are in need of some form of online or organizational improvement, and WPI students could provide assistance in either category. Projects may be limited to these categories, but many projects would last over one year due to the challenge at hand for the students. Any of these potential projects would greatly benefit the community by essentially improving and organizing the history of the area. Students would gain high levels of organizational skills and complete projects with a sense of betterment to the community. The overall likelihood for successful projects is high for Merging Technology with Local Libraries and Museums.

4.1.8. Storm Drain Upgrades

4.1.8.1. Overview:

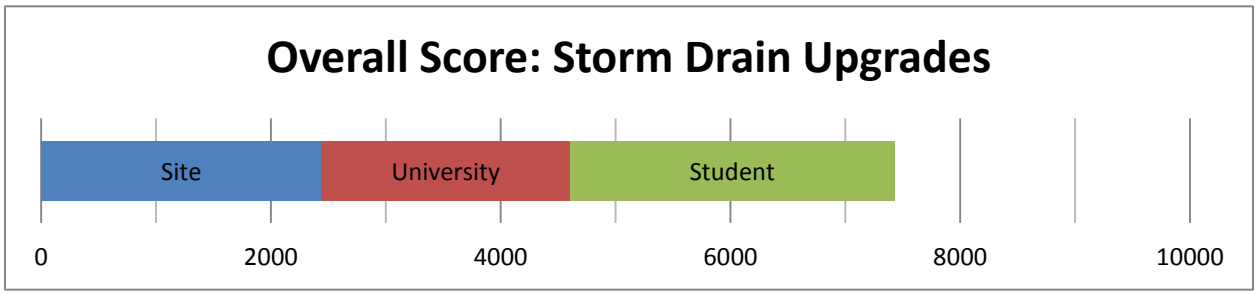

Figure 4.64

In Bar Harbor, Maine, there exists an issue with the ability for the storm drains to keep up with heavy rainfall. These issues are partially due to an aging infrastructure, and also in part due to growth of the town without appropriate expansion of the drainage system. WPI students, using their engineering and science backgrounds could address this issue with a detailed report on the cause and effects of a lacking drainage system, and propose the solution(s) to the problem(s). This project concept arose from the Bar Harbor Town Council 2012 goals, which details the towns' goals from fiscal years 2012 through 2017, more specifically Part 3 of Section D "Infrastructure", which notes the need to "Identify, prioritize and begin storm drain infrastructure upgrades. ~ Public Works Director ~ FY13." Considering that the task is already on schedule for 2013, the project may be suitable for the coming year, but not after.

4.1.8.2. Statistics:

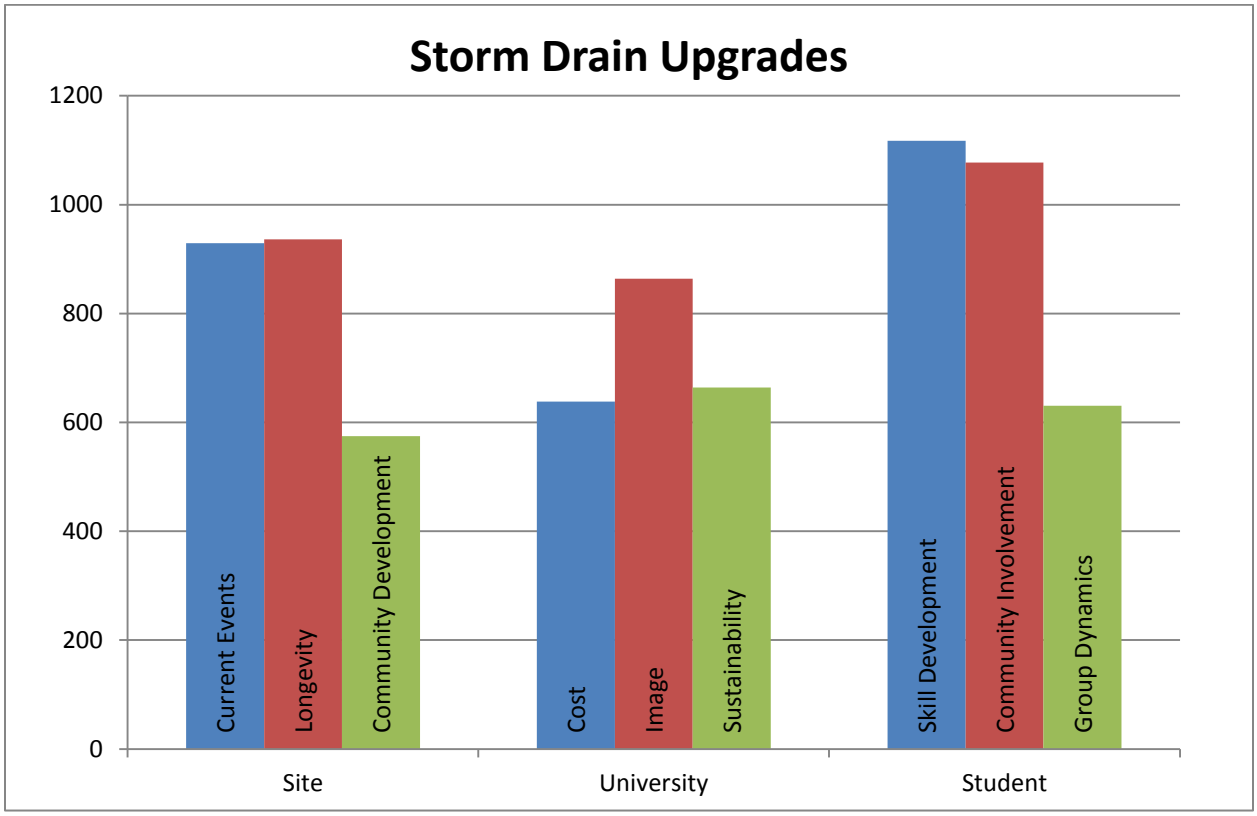

Figure 4.65

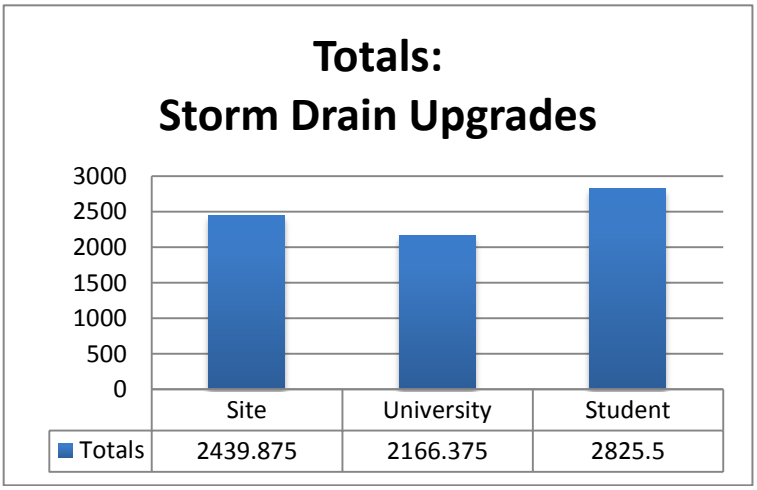

Figure 4.66

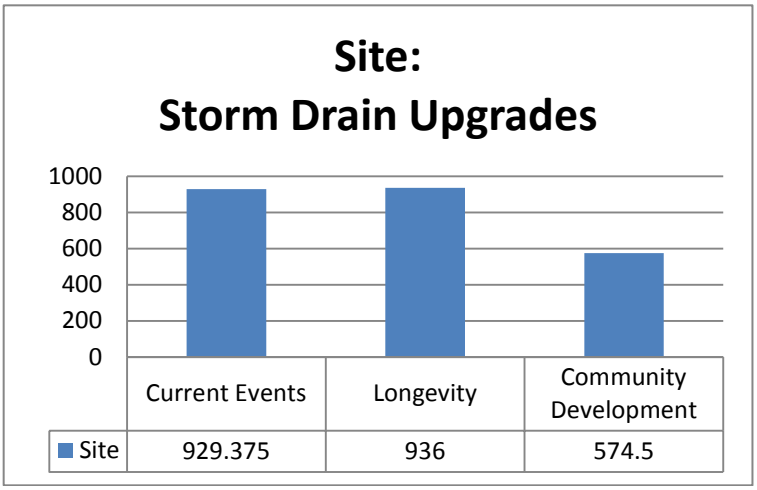

Figure 4.67

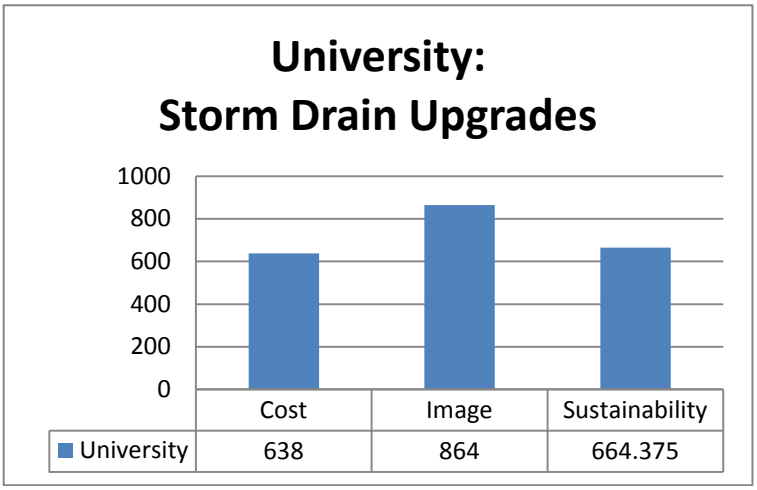

Figure 4.68

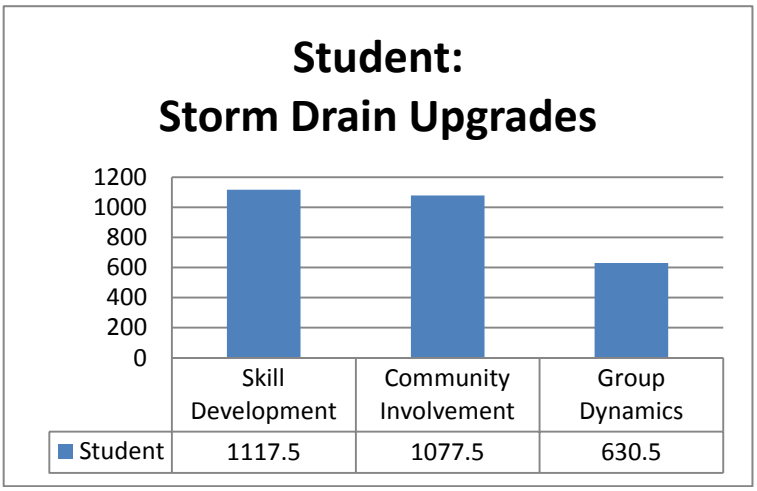

Figure 4.69

Site:

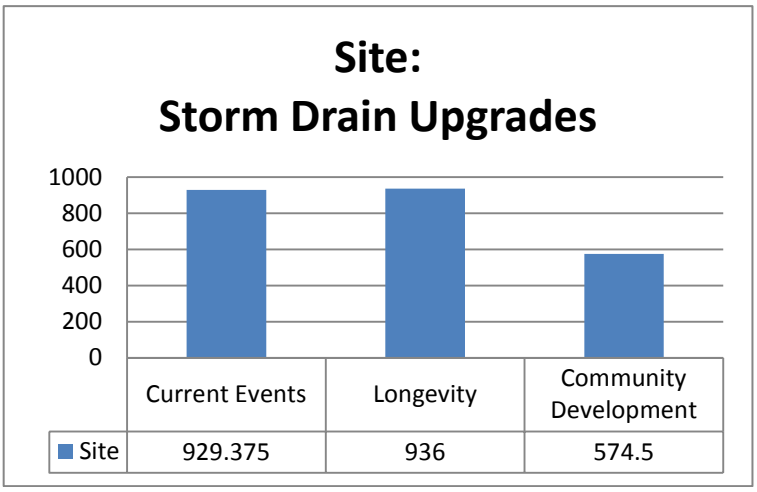

Figure 4.70

A project addressing any infrastructural issues within a town or city should be considered as feasible site-wise, however, some concerns must be addressed before delving into the work. Work to remedy the issues with the drainage system in Bar Harbor would have a favorable impact on topics pertaining to current events. Furthermore, the potential longevity of the project presents a feasible score where no value performs particularly poorly. Unfortunately, the collective performance of this project with respect to community development falls short of many others.

The impact of the project on the business within Bar Harbor would benefit from the creation of job opportunities if the project moves from research to construction. Businesses would also have to concern themselves less with the risk of flooding due to the drainage system failing. For these reasons, the score chosen for business was moderately high. Education of the community with regard to current events would fare less well because the status of the drainage system only concerns those who work on, or with the system. Despite this, the educational value is slightly above average, in that knowing about the status of an infrastructural system in town is more relevant to residents than other potential work. For these reasons, the score chosen for

education was above the baseline score. As those students who would work on this project would be solving a problem directly identified by the town, the government portion of the current event fares exceedingly well. In the event that the students work directly with the town, their involvement with the government would benefit quite well. For these reasons, the score chosen for government was moderately high. The environmental impact of this work is exceptional as well due to its potential benefits to the water quality throughout the town and surrounding areas. Without an appropriate method of drainage, flooding and pooling can occur, leading to unsanitary water throughout the environment, however the status of Bar Harbors system is not in the dire state that. For these reasons, the score chosen for environment was an intermediate one.

When addressing the longevity of an infrastructural project, the approach to the work must be considered. Sorting out problems with a whole infrastructure presents an immense workload that could be approached in a long term method, where, over several projects, the issues are addressed one by one. Otherwise, a single project that covers the issues and solutions of a variety of infrastructure topics could be done, in which case the amount of content would fare less well. For this reason, the score chosen for amount of content was moderately high. The continuation of the work done in this project is difficult to comment on. Depending on the approach taken, and the reception of the work, the project could enable other projects, but it is unlikely, that once the work is done, that another major infrastructure issue will arise in a timely fashion. For this reason, the score chosen for enables other projects was just above the baseline score. Similar to the reasoning behind the ability for this project to enable other projects, the expandability of this project is limited to the issues currently affecting the water drainage infrastructure. Unless other infrastructural issues arise, once this projects work is completed, the

expandability of the work is only just above neutral. For this reason, the score chosen for expandability was just above the baseline score.

For community development, this project fares less favorably than the rest of the site oriented scores. With regard to transit, the project doesn't do much to improve the transit system throughout the town. Despite this, better drainage throughout the town may improve the walkability of the streets. For this reason, the score chosen for transit was just above the baseline score. Town upkeep fares much better than transit in that it involves directly working on the town and the upkeep of its infrastructure. For this reason, the score chosen for town upkeep was moderately high. Unfortunately, this project has almost nothing to do with the educational systems in Bar Harbor. Students working on this project would almost exclusively be researching the issues, or working with the town to identify solutions. For this reason, the score chosen for education with regard to community development was very low.

4.1.8.3. University:

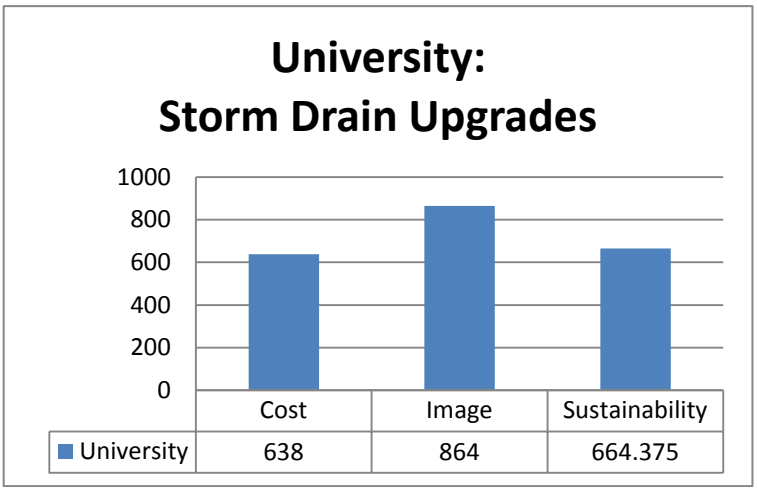

Figure 4.71

Working on the drainage in Bar Harbor has scored moderately well with regard to the University point of view. The work is low cost, with an average impact on tuition, a low investment, and a high likelihood of sponsorship. It provides a positive portrayal of image for Worcester Polytechnic Institute, and works out to be just above normal for sustainability. In general, this project is relatively average with respect to the university ranks.

The impact funding this project would have on tuition is quite average, in that there is nothing about it that either make it less expensive or more expensive to the university, than any other work. For this reason, the score chosen for tuition was a baseline score. Unless fully sponsored, this project presents a slight investment for equipment for testing water quality and potentially surveying tools. For this reason, the score chosen for investment was an intermediate one. This project is quite likely to be sponsored due to the fact that the town currently recognizes the drainage systems as an issue that need remedy. The town of Bar Harbor would be the prime target for acquiring sponsorship because the storm drains are under town jurisdiction. For this reason, the score chosen for the sponsor category was a moderately high one.

Because of the technical and rather bland topic being addressed, the image the project could portray does not stand out. The humanitarian aspect of upgrading storm drains nearly ceases to exist. Only when considering the preservation of water quality could there exist humanitarian impacts to the work. For this reason, the score chosen for humanitarian criterion was relatively low with respect to other projects. When addressing how well this project work conveys the image that Worcester Polytechnic Institute is a cutting edge institution, the fact that modern sewer systems are commonplace in the United States must be considered. Within the scope of the town, and its existing infrastructure, the opportunity to do something truly cutting edge is limited, however, applying new environmental and civil engineering practices could be considered technological progress for Bar Harbor. For this reason, the score chosen for cutting edge was an intermediate one. Improving infrastructure to one that functions better and serves to limit water quality issues can be considered one that imbues a green image in the university, therefore, the score chosen for green was moderately high.

Addressing the sustainability of this project is difficult in that it doesn't toil with energy renewability or efficiency much. The criterion renewability received a baseline score because it does not directly promote or inhibit the use of renewable resources. The criterion efficiency received a score just above the baseline because it serves to improve the functionality of the drainage system, and thus improve its ability to efficiently tackle high flow storm waters. This project is a very base line one with respect to its effect on sustainability.

4.1.8.4. Student:

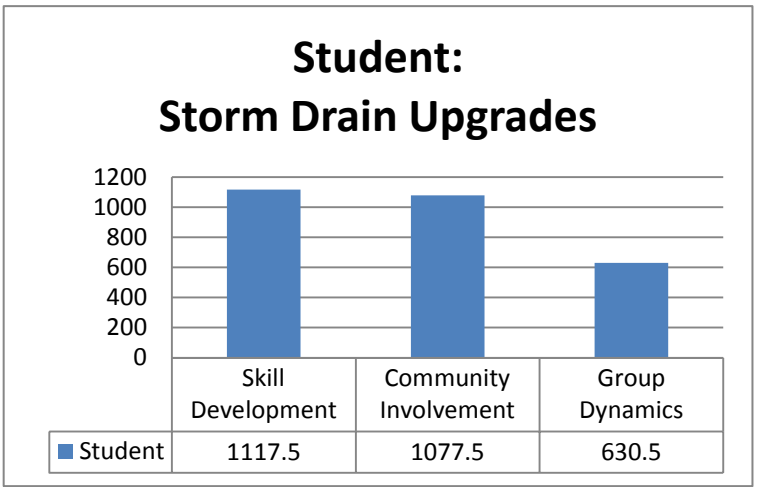

Figure 4.72

A project dealing with the upgrading of storm drains requires some background education on the design and implementation of water infrastructure. This restricts this project's ability to accommodate a variety of student majors. The project content that would exist for a storm drain upgrade project would be more feasible as an MQP for civil and environmental engineering. Despite this, the project would promote organization amongst project members. This project is a good example of a baseline (overall) score with regard to group dynamics.

This project fares much better when considering its community involvement in Bar Harbor. Since the issue presented by this project is a town concern, students will likely collaborate with the government and the department of public works. This involvement with the government and people makes the project score more favorable than most other projects in this criterion. Students may interact with town-goers when surveying possible infrastructure, but outside this contact, their non-WPI interaction is slightly limited to those people who work directly with them.

The educational value presented by this project will vary for each student depending on their specific major. Students practicing civil or environmental engineering may draw more

insight from this project than students studying other majors. These major specific students could utilize this project as a real-life application of their knowledge of the material. Students of a non-specific major could take a different approach to this possible project and use the challenge presented as a tool for advanced skill development. The quality and quantity of possible gathered data and results will be more useful for the town than for the students, and the overall value of data will prove extremely useful for the community of Bar Harbor.

4.1.8.5. Personal Analysis:

A project dealing with addressing the aging storm drain infrastructure in Bar Harbor is a feasible project but may be more suitable as an MQP. The project would bring students into the community so solve an ongoing issue with the town's infrastructure. The work may open up the town of Bar Harbor as a sponsorship opportunity if the project is successful enough to peak the town's interest. Although the project is beneficial for the community, students may lose project interest if the project is approached incorrectly. There are no unusual or unique problems presented by this project because Bar Harbor has a normal, aging infrastructure. Project work similar to this fashion is done regularly throughout the United States.

4.1.9. Traffic and Parking Issues

4.1.9.1. Overview:

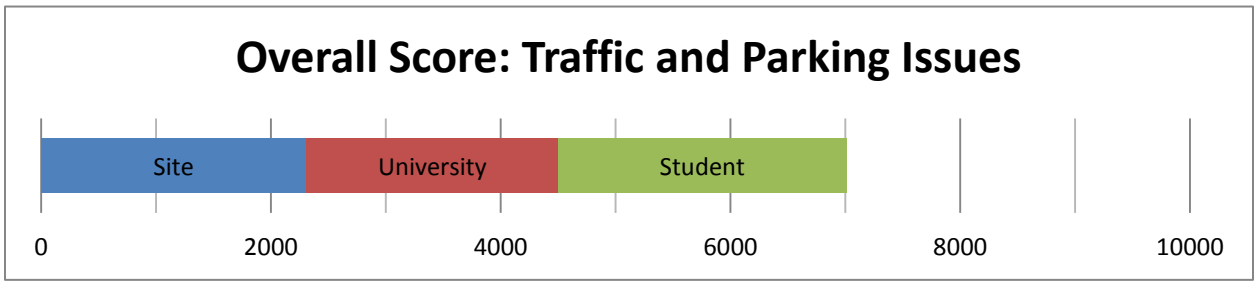

Figure 4.73

Bar Harbor attracts over a million tourists to Mount Desert Island each year and is home to a thriving tourist industry. The majority of these tourists reach the island with personal vehicles, causing traffic and parking space issues. Route 3 is the only road available for entering or exiting the island, and sees a very large volume of traffic each day. Areas of high interest also collect large quantities of vehicles, congesting the roadway and exceeding the limits on local parking facilities. This project aims to reduce these problems utilizing creative methods to better control and reduce traffic.

4.1.9.2. Statistics:

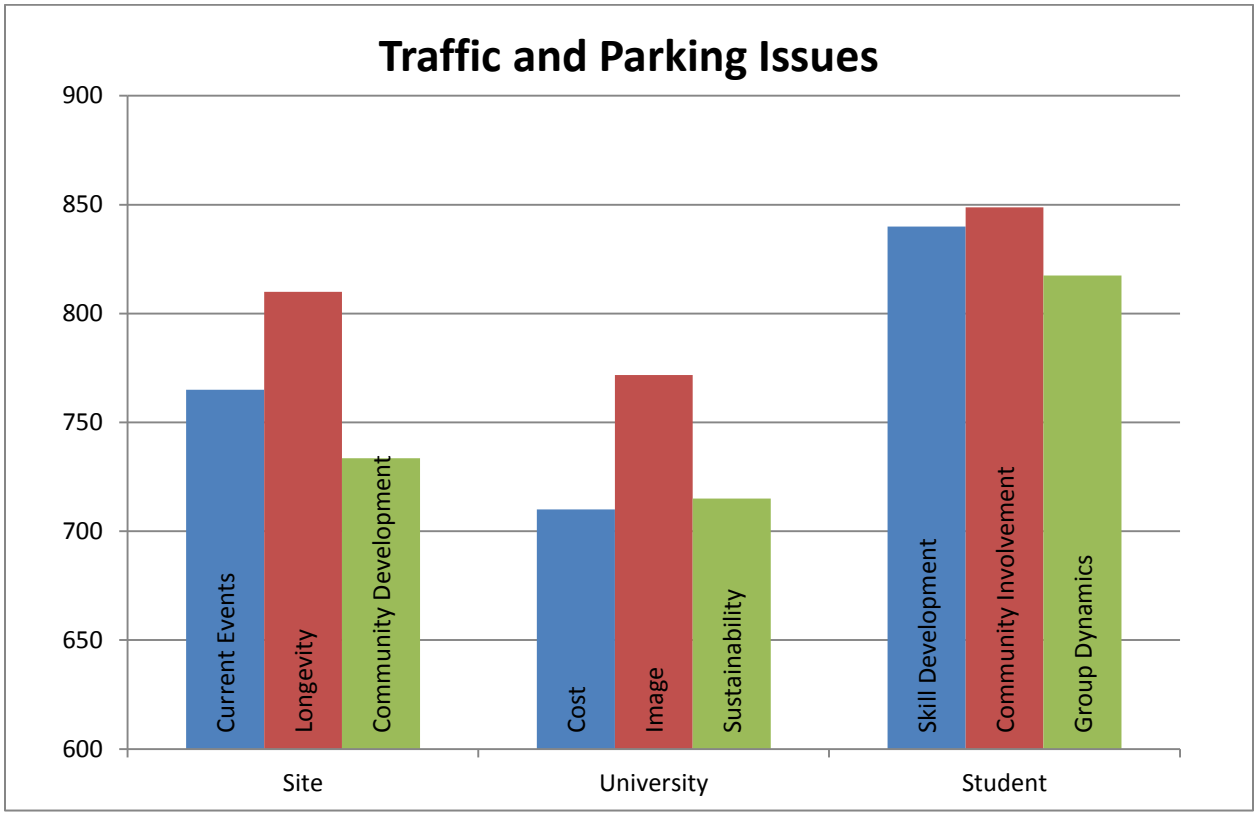

Figure 4.74

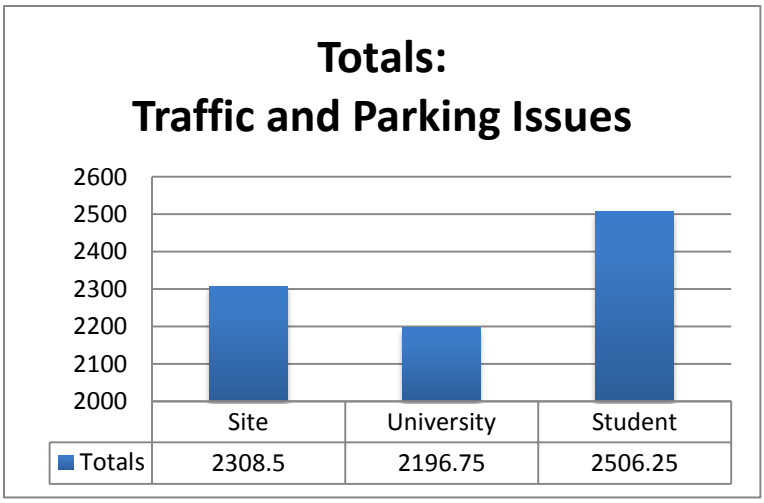

Figure 4.75

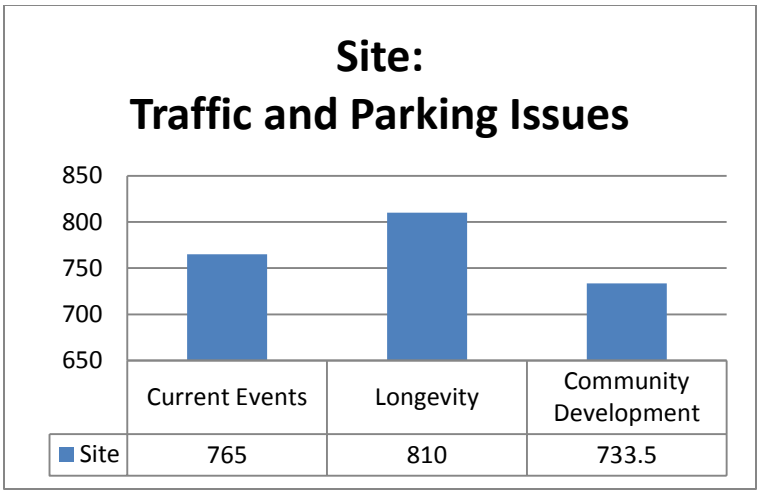

Figure 4.76

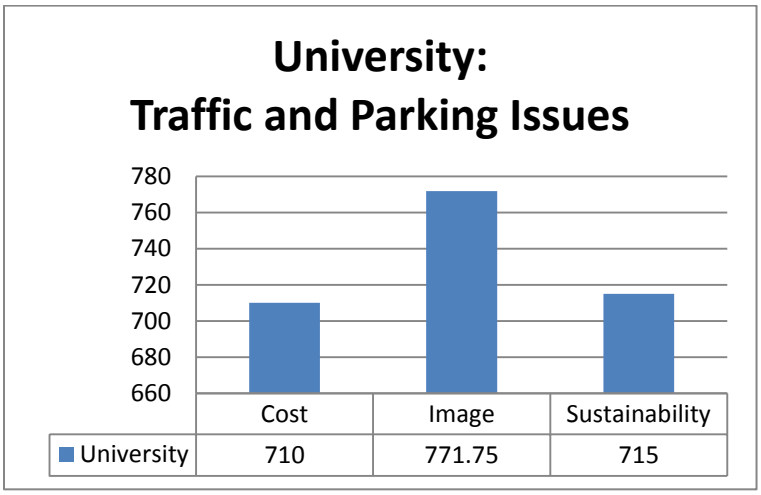

Figure 4.77

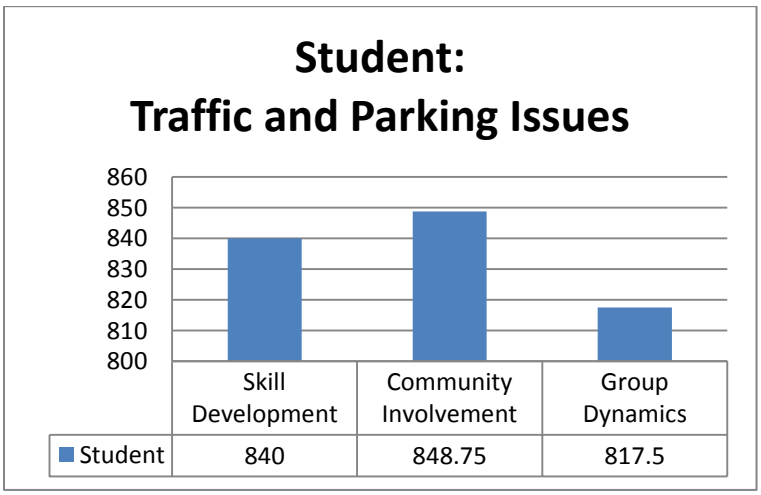

Figure 4.78

Site:

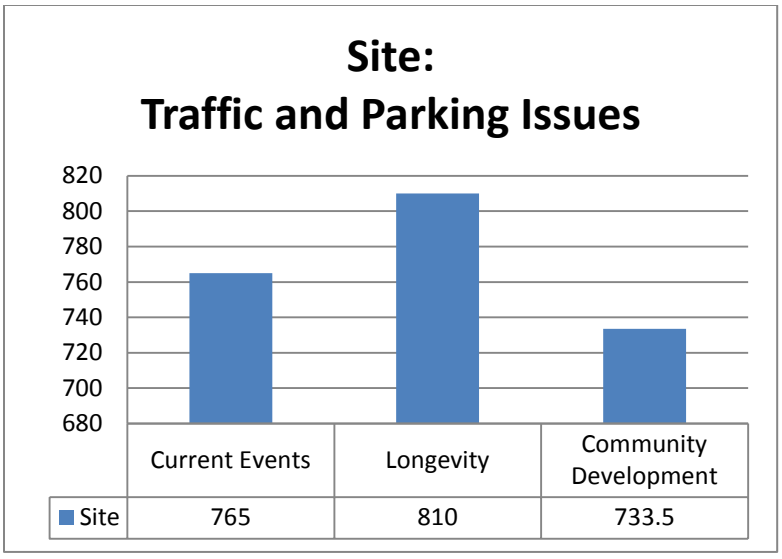

Figure 4.79

This project will provide excellent results for the local businesses in Bar Harbor. As it stands, many of the shops and restaurants in town are difficult to reach by vehicle, and a successful outcome of this project will remedy that problem. This project will also educate the public in proper organization and implementation of dedicated parking areas and traffic management. The government will also receive some benefit with one of the city's long outstanding problems solved. The environment will not receive much of a benefit. Reduced traffic would help decrease the ambient noise level in the area, but additional parking areas will encroach upon local forests and natural habitat.

This project will cover an average amount of content for an IQP, and has no special properties worthy of note. The project will enable another project to assist in the implementation of solutions into the town's infrastructure. However, this project is not very expandable with much of the required content covered by the first project group on the job.

The local transit systems will receive a huge boost due to the results of this project. Solving the issues with traffic and parking are the best things that could be done for the transit system. Town upkeep shall also be improved as a result of this project due to better infrastructure

added to the area. Local educational programs will not receive a boost from this project, perhaps with the exception of decreasing the difficulty for bus drivers to reach their destinations.

4.1.9.3. University:

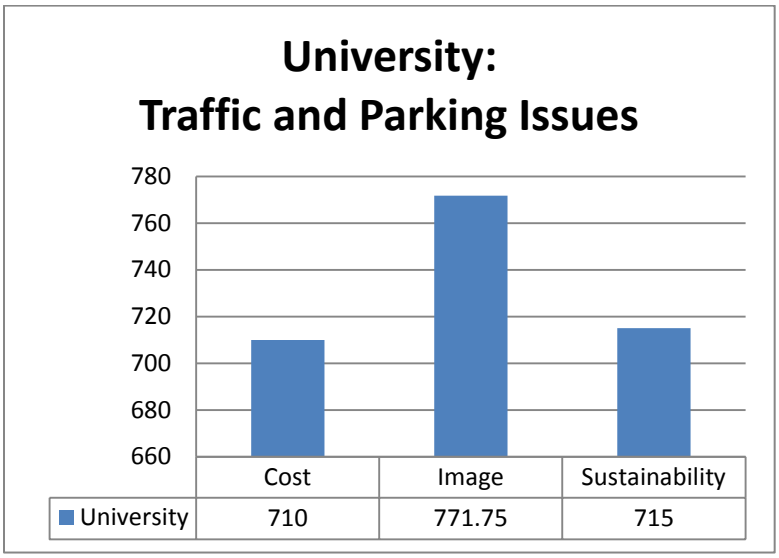

Figure 4.80

WPI will charge standard tuition to all of the members involved with this project. The university would do well investing in this project, as its projected overhead costs are minimal. This project would also help to put WPI in good relations with the local government and business owners, encouraging potential sponsors to invest in future projects.

The project by nature is not very humanitarian, instead focusing on transit system improvements. The project also does not use cutting edge technology to achieve its goal, nor does it necessarily involve the green initiative or help make the area more energy efficient, with the exception that a better transit system would reduce the time on the road for most drivers and decease fuel usage. The project also does not cover the topic of renewable resources.

4.1.9.4. Student:

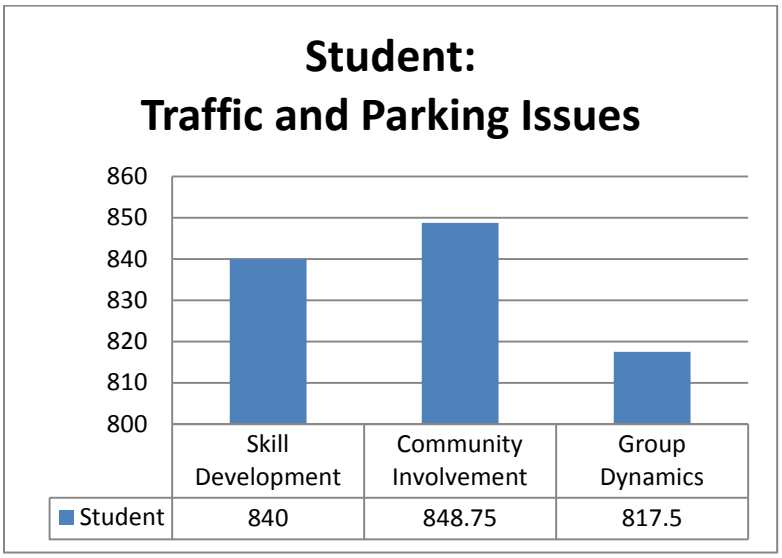

Figure 4.81

A wide range of student could successfully complete this project and does not require any specialization in related fields of study. There is an above average level of organization required to bring the project to a successful conclusion, as much research will be required of the students.

The students shall be expected to interact with the local government of Bar Harbor on a regular basis to discuss local laws and specific traffic problems in detail. They will also need to talk to some local businesses to determine how much they would be willing to be inconvenienced to solve this town problem. Due to the interactions with non-WPI members, this project is expected to have a slightly above average educational value associated with it. The outcome of the project will provide an average amount of data.

4.1.9.5. Personal Analysis:

This project does not particularly stand out as a priority in comparison to other projects. Several different approaches to the problem could effectively be utilized to provide an acceptable solution, allowing a diverse group of students to achieve the desired outcome. However, most of these techniques shall require an in-depth knowledge of at least one relevant skill set, such as computer modeling of traffic or a good persona for interacting with the local population.

A positive note about the project is that a good result would not only help the local population and tourism, but it would allow future projects to reach various locations more easily, providing a direct benefit to WPI students in addition to the town. Additionally, the noise from local roadways would be reduced, providing a benefit to housing accommodations as well.

4.1.10. Additional Town Revenue

4.1.10.1. Overview:

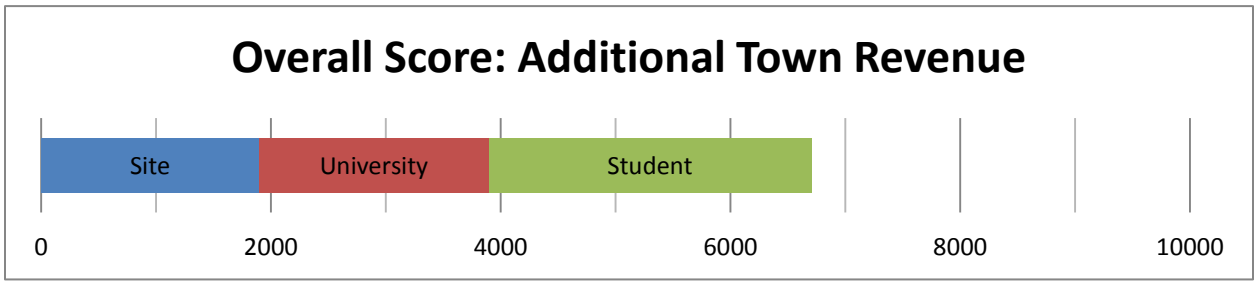

Figure 4.82

Each year, Bar Harbor attracts well over a million tourists to the island town and Acadia National Park. The summer months see the highest population of tourists throughout the year due to the favorable summer climate, but this leaves a large gap in income for the winter months. This project shall investigate the possible methods of creating additional revenue for the town after the tourists have left the peak season.

4.1.10.2. Statistics:

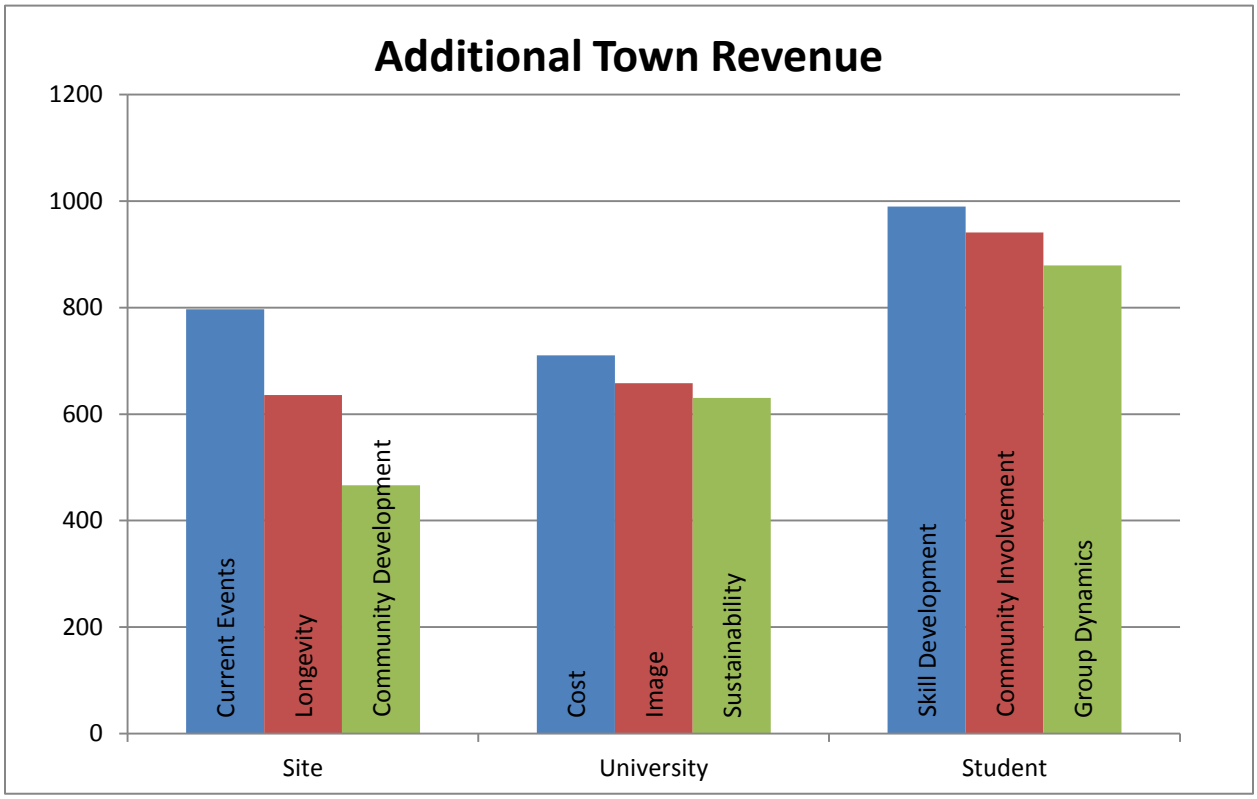

Figure 4.83

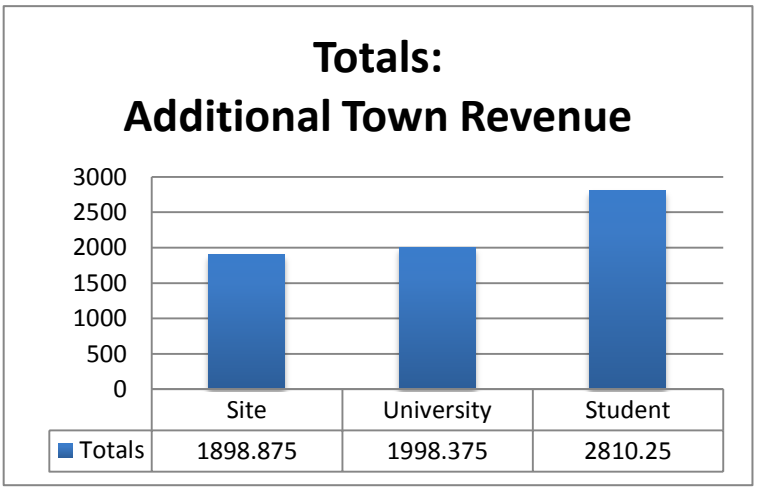

Figure 4.84

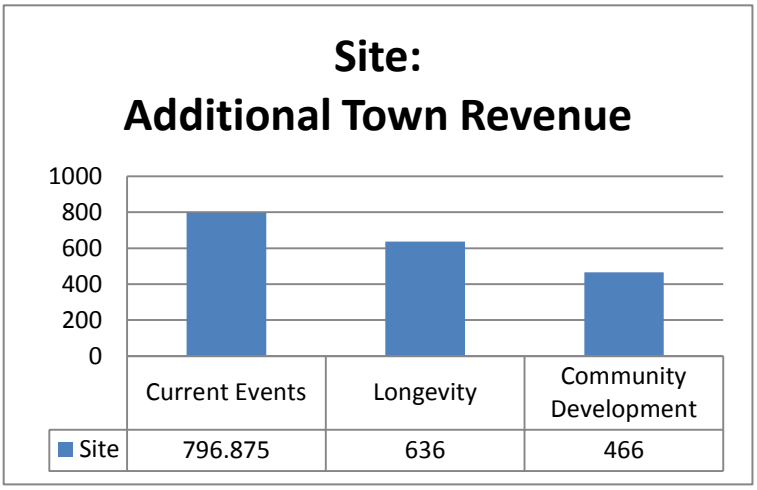

Figure 4.85

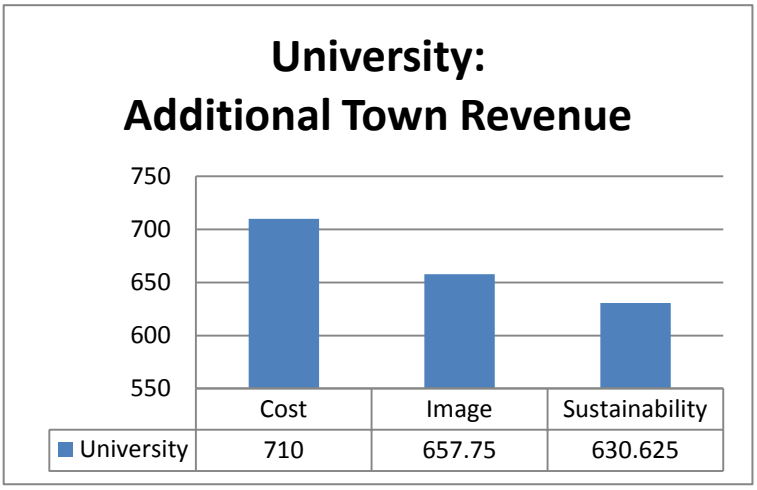

Figure 4.86

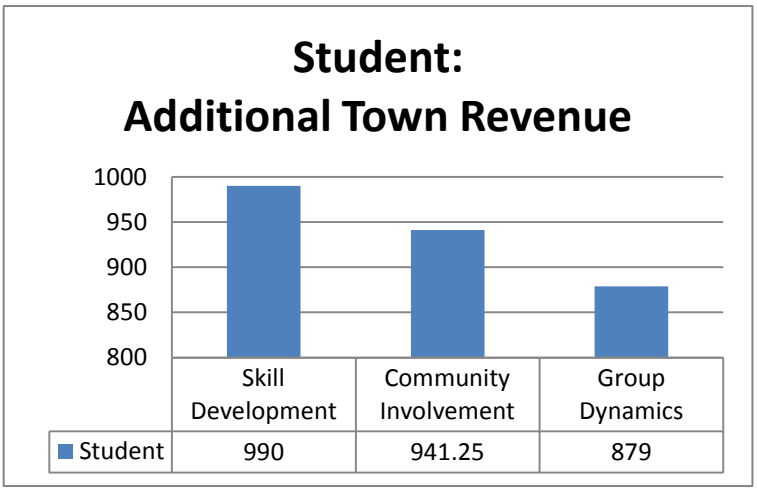

Figure 4.87

Site:

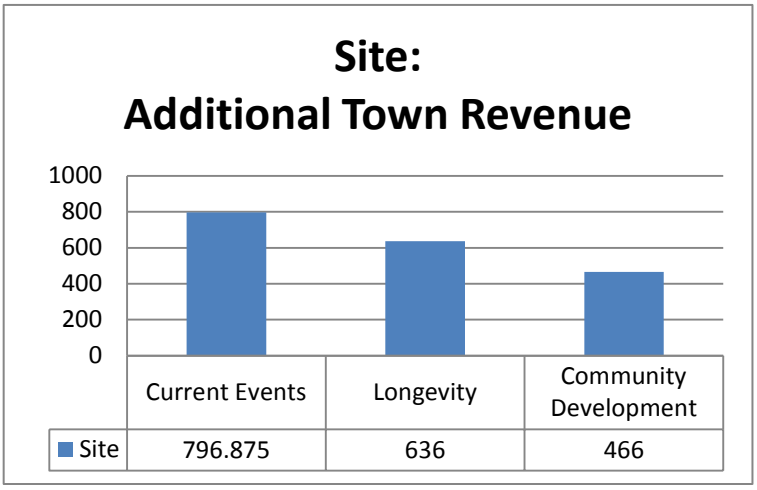

Figure 4.88

This IQP helps local businesses immensely by helping to normalize their income throughout the year. By extension, it should additionally help increase their annual profits as well by increasing the amount of time throughout the year where a large income is possible. The IQP is also great for the government that is burdened with the responsibility of ensuring the well-being of the local population. Additionally, by increasing profits across the island, the government will see an increase of money going into taxes. The additional revenue will ensure the government has the ability to spend money to help the community when necessary. This project will not help educate the community, but will simply point out methods of making money to them. The project will also not help the environment, and the potential increase in activity due to the results of this project may disturb the ecosystem.

This project will cover a sufficient amount of material expected of a WPI major project. The students will be required to research many different forms of creating income from multiple disciplines, and compiling the vast amount of data collected will be difficult. This project will not enable any other project because the responsibility of implementing any ideas is solely up to the discretion of the local population. Once the work is completed, there will also not be much

room for expanding the project's scope for additional groups.

This project is not expected to affect the local transportation systems very much. Any increase in traffic volume to the results of this project may be offset by additional ideas for local public transportation systems. The project will help the town upkeep, albeit indirectly. The additional money will assist the local population to ensure the town continues to look proper and attract tourists. The project will not in any way touch upon local public education systems.

4.1.10.3. University:

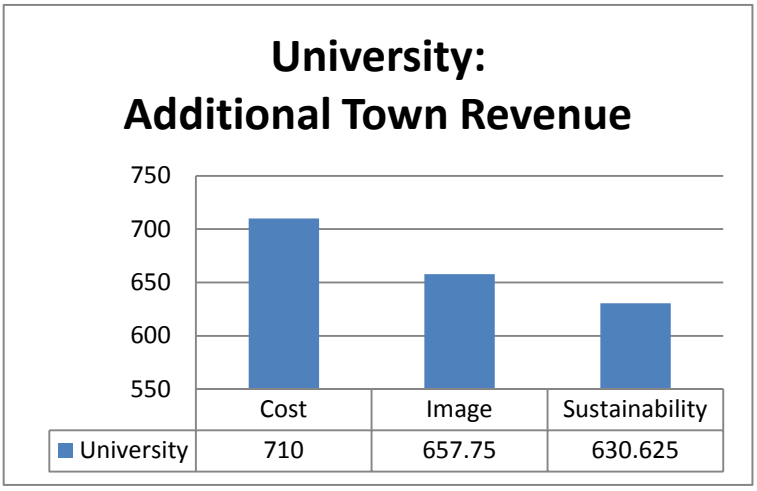

Figure 4.89

The school will receive the standard tuition from each student participating in this project. The project does not require much, if any, monetary supplementation from the school for the student to be able to do their work. Additionally, this project will reach a wide audience of people living in Bar Harbor, and shall help improve WPI's reputation in Bar Harbor. It would be wise for WPI to sponsor this project themselves given that any other sponsor in the area may have a bias towards methods of income generation that are easier for them to obtain.

This project is not humanitarian, but rather is a study designed to help businesses. The project does not necessarily utilize cutting edge technology, either. The students may find a solution to the problem that uses modern technology, but this is not a fundamental focus or requirement of the project. The project is also does not focus on green initiatives, leaving only the possibility of its implementation up to the students involved.

This project does not focus on the use of renewable resources or energy supplies. Any forms of these resources that are used by the project are coincidental. The project also does not focus on efficient use of energy.

4.1.10.4. Student:

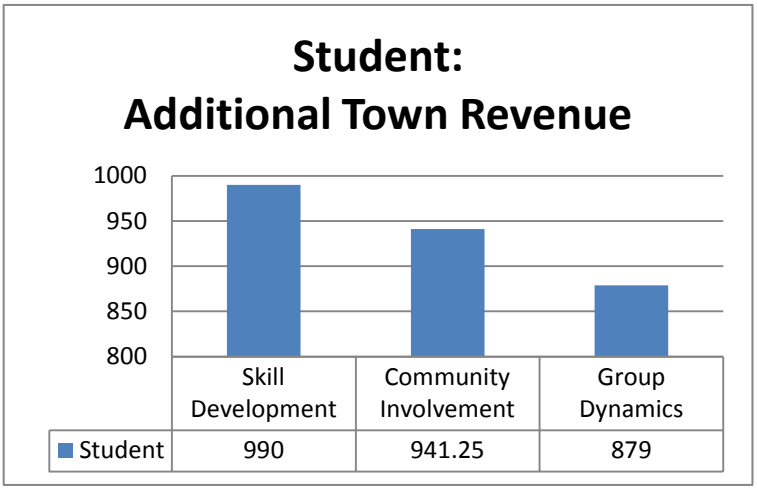

Figure 4.90

This project requires no background expertise from the participating students in order to develop solutions to the problem. A wide range of diversity in students selected is encouraged for the project advisor; many backgrounds will ensure the maximum number of possible solutions for the project is provided. Such a diverse range of possible solutions will also require a great deal of organization on the student's part in order to compile all of the data into a solution set.

The students will be required to heavily interact with the local government in Bar Harbor for a number of reasons. They will need to determine the legality of any ideas to solve the problem, as well as determine what areas any possible solutions could be supported. They will also need feedback for what the government thinks will be possible to do in the town as well. Outside of the government, the students will have some interaction with the local population. This interaction will probably be limited to questioning business owners about what they think about possible project solutions.

The students will learn about various industries while attempting to provide ways for residents to make more income. The students will also learn about the laws of Bar Harbor and

what forms of business are allowed in the area. At the project's conclusion, the amount of diverse data collected and analyzed is expected to exceed the amount from an average IQP.

4.1.10.5. Personal Analysis:

This project is not recommended for a project group within the next couple of years. For this project to be a success, it will probably require the assistance of someone who is well versed with the nuances of Bar Harbor's annual cycle of tourists, as well as detailed information about the laws that govern Bar Harbor. For the best results, the project advisor will need at least a few years of experience working in Bar Harbor before he may provide proper direction for the students.

Beyond the complicated problems that have prevented a solution from being found by the residents, this project does not seem particularly interesting from a student's point of view. The results of the project will all be theoretical and the student will not stay in Bar Harbor long enough to see any of the results from their work. This project also does not cover the fundamental purpose of an IQP very well, namely the use of arts and humanities to bring science and technology into society.

4.1.11. Enhancing Town Boating Docks

4.1.11.1. Overview:

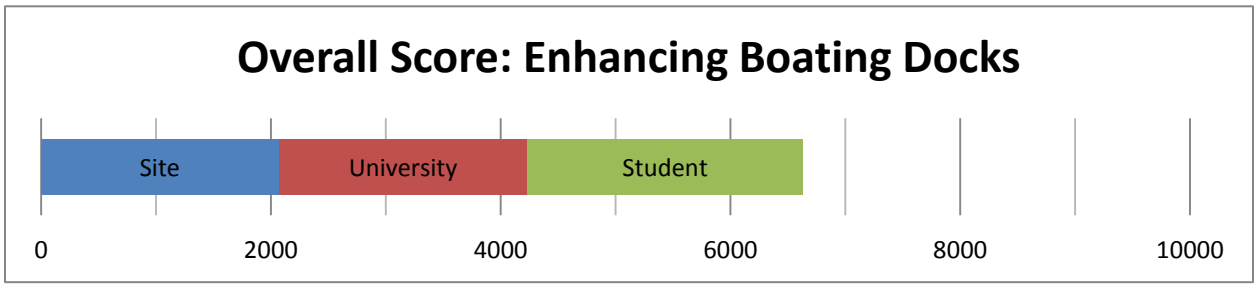

Figure 4.91

Several years ago, a cruise liner running from Bar Harbor to Nova Scotia was shut down, leaving behind a large boating dock on the shore of Bar Harbor. Today, this dock remains where it was, unused by any of the local businesses or populous. This project's goal is to find several possible applications for this dock so it can be repurposed and used instead of lying dormant on the shore taking up valuable shoreline space on the coast of Bar Harbor.

4.1.11.2. Statistics:

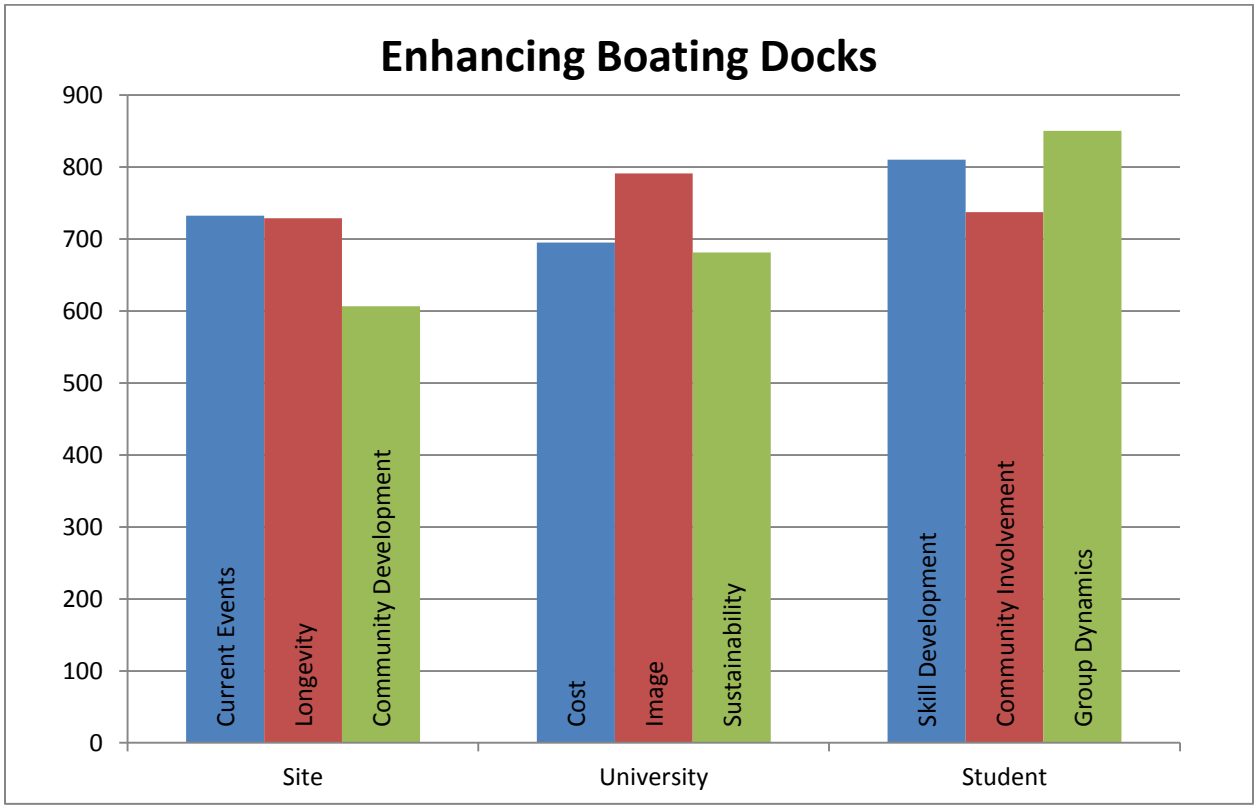

Figure 4.92

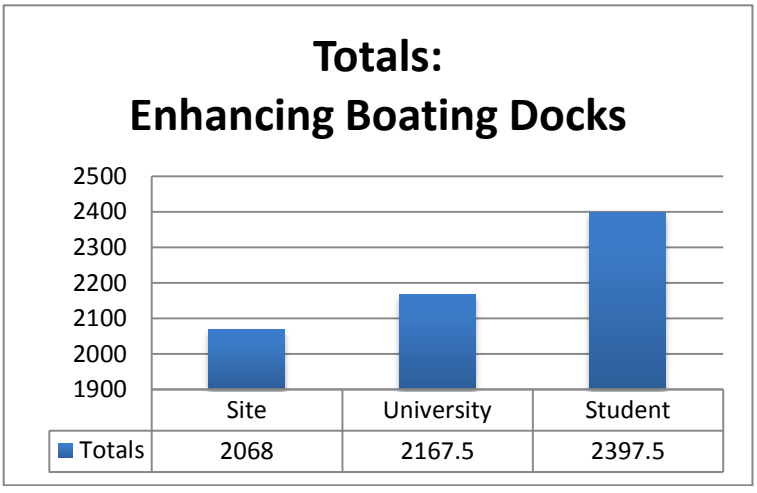

Figure 4.93

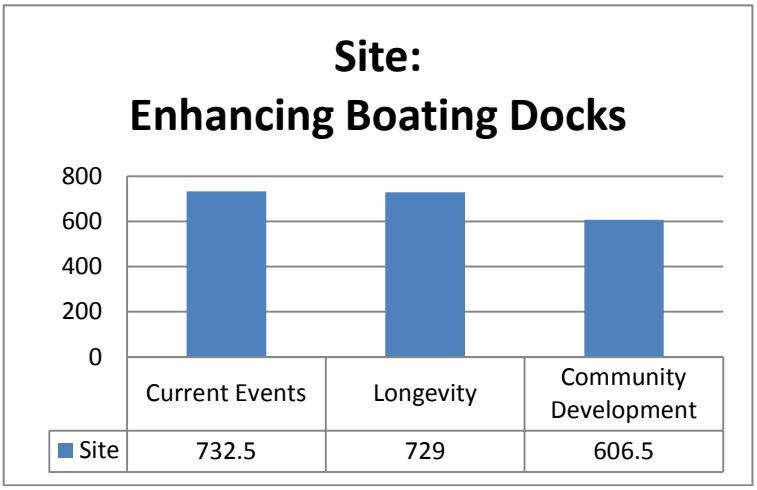

Figure 4.94

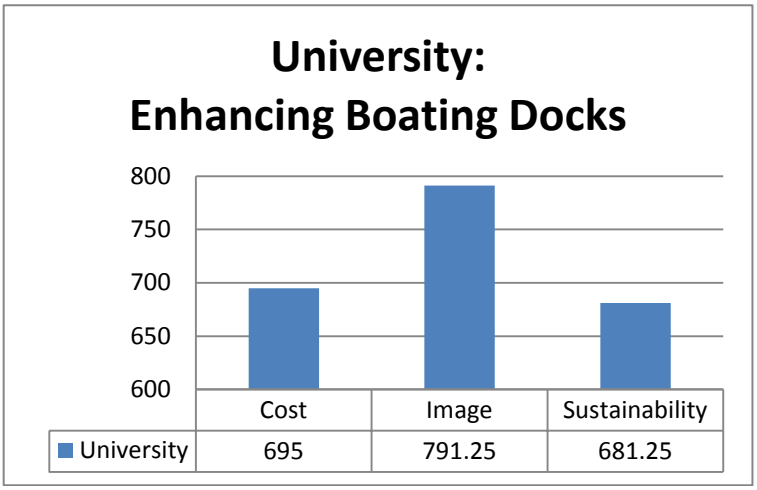

Figure 4.95

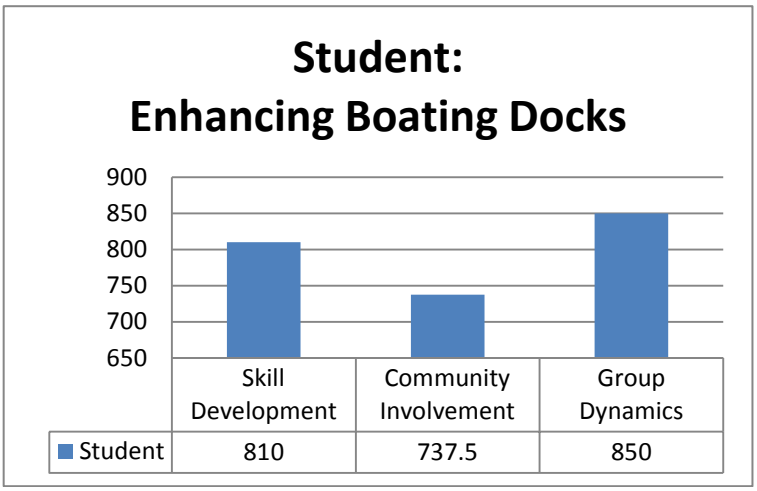

Figure 4.96

4.1.11.3. Site:

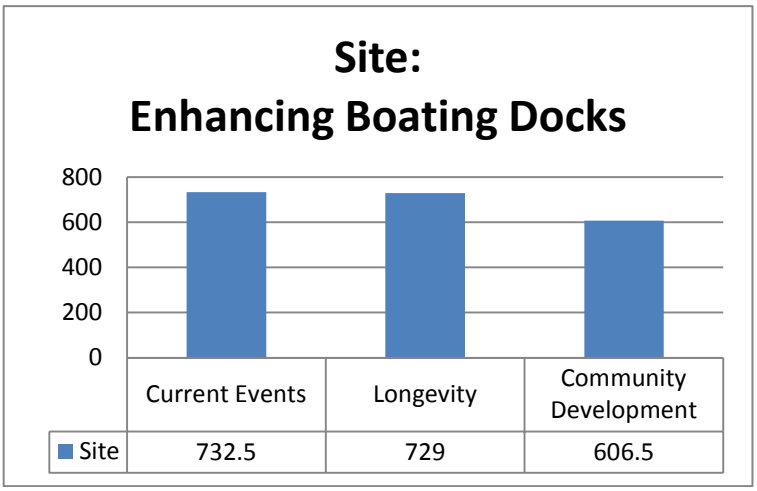

Figure 4.97

A project designed to evaluate the potential uses of a retired cruise ship dock could benefit the community in a number of ways. The potential to help local businesses is large, considering that the fishing, ferry, and aquatic entertainment industries all rely on high quality boat docks in order to operate. This dock has the potential to accommodate a large variety of marine applications, thus local business will improve no matter what this dock is repurposed for. This dock will not help immediately educate the public more than some other projects, but it should open the imagination of local entrepreneurs in using local resources for potential business. The local government should be somewhat pleased that the space being taken up by the dock has the potential to be used for something constructive that can help the town, but the project does not entail implementing a solution. Unfortunately, it is foreseen that no matter what precautions are made, the amount of boating traffic in the bay will be increased as a result of the dock being used again, hurting the local wildlife. Therefore, this project is below average in terms of ranking how it impacts the environment.

This project is not very ambitious in terms of how much content it must produce before a desirable result is achieved. Therefore, it receives an average score in how hard the students will

need to work on this project. This project also does not enable other projects very well. It will enable one very specific project that could actually take the data from this project and implement the solution found, but it does not enable anything else. The amount this project may be expanded is rather poor. After various solutions are discovered by the project team, they will have already answered the fundamental questions that were desired, and there shall be no need for further research into the subject. Therefore, this project ranks poorly for its longevity as a viable project or series of projects.

The purpose of a dock is to provide a place to store and land aquatic vehicles. Regardless of the actual purpose the dock will serve, it will improve transportation conditions in the bay of Bar Harbor. The town will also be able to make some money from the dock through either taxes or fees, and will decrease wasted space in the town. Therefore, the town upkeep will slightly improve due to the results of this project, although it is outside of the town itself. One thing this dock will not do very well is improve the local education systems at Bar Harbor. The local high school has no real reason to own a boat dock as high school curriculums are fairly structured and don't have much time to delve outside of the normal boundaries of education at that level. The only university of the island, the College of the Atlantic, already has their own boat dock and do not require a new one. It is possible that the dock could be used for educational purposes for organizations or other private institutions in the area, so the dock only ranks slightly below average for educational value.

4.1.11.4. University:

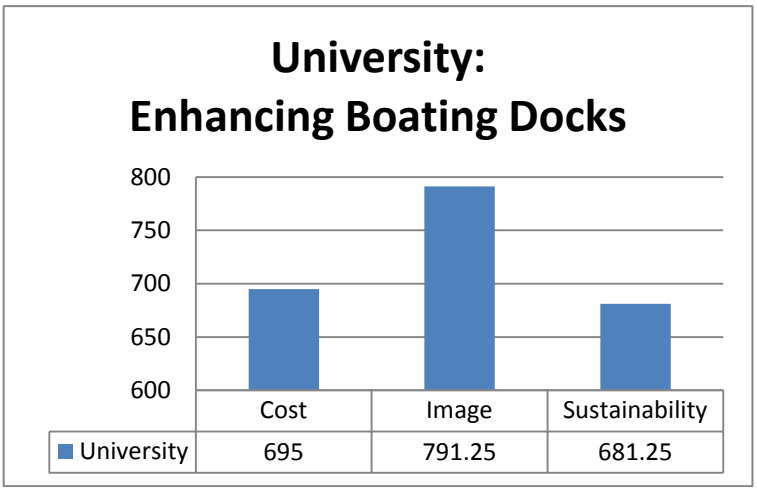

Figure 4.98

The costs incurred to the university to ensure this project runs smoothly are minimal. No additional tuition to help cover the costs of operation shall be required to allow students to work on this project. From an investment standpoint, it would be wise for the university to supply whatever minimal costs this project requires. The work the students shall do should be appreciated by the local populous, and may end up promoting the school as well as advertisement for a lesser cost. This project is also a prime candidate to be sponsored either by the local government or various businesses, as there are many people who could already be invested into the dock and would be interested in seeing it be used for a purpose again.

Many in the population of Bar Harbor would appreciate the work being done, but outside of Bar Harbor this project is not of particular note. The project is not necessarily associated with any humanitarian aid, although it does provide free help to those that do not have anything else to do with the dock. The project is also not particularly delving into cutting edge technology, although there remains the possibility the students will chose cutting edge means to repurpose the dock. The project is certainly not green, either. Nothing in the project description indicates any utilization of green technology, so it cannot be rated well in that category either.

Similarly to the university's image outside of Bar Harbor, the project doesn't truly stand out from a sustainability standpoint either. The project does not specifically include any research or implementation of renewable energy and materials. The project also does not look into energy or material efficient use in order to repurpose the dock. Space efficiency for the town is related to the project topic, however the dock is so far outside of the town the rating for this category could not be increased by a large amount due to this fact.

4.1.11.5. Student:

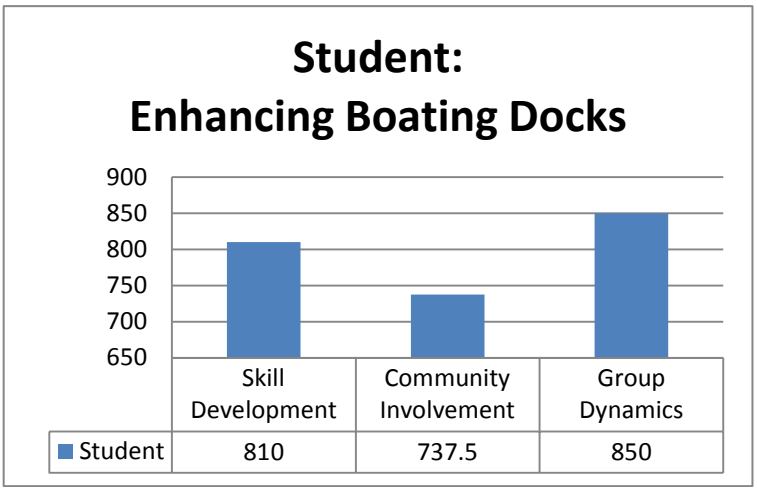

Figure 4.99

Research into ways to utilize Bar Harbor's large cruise ship dock requires almost no prior skills to accomplish. The only requirement to contribute effectively to the project is the ability to research well, which at the very least will be learned during the time preparing to do the project. This project will require with a lot of research and ideas, and organizational skills will be important to bring everything all together. Group dynamics will play a very large role over the course of the project.

There will be some community involvement for the students during the course of their research. They will need to speak to the local town government in order to gauge what ideas would be considered legal uses for the dock in respect to town ordinances and zoning laws. They will also need to speak with local businesses to determine what functions they may utilize from a repurposed dock. However, outside of the government, large amounts of interaction with non-WPI community members is not expected, and rates about average compared to other projects.

The educational value of the project is slightly above average, but not much more. The students will learn about local ordinances and zoning laws concerning marine applications and structures, as well as learning about a plethora of applications that may be applied to a boating

dock. The amount a student will learn from the project is not expected to exceed those boundaries, with the exception of what students will naturally learn at any project center such as living with other students and how to write a professional paper. The students are expected to gather a large amount of data concerning the specific topic of boating docks; data concerning anything outside that boundary will not be researched. This devalues the quality of the data slightly, as the amount of material available for cross reference will be somewhat limited.

4.1.11.6. Personal Analysis:

This project should be considered a possibility for student groups that are not necessarily qualified for other projects being offered on site. The main issue of this project will be attempting to figure out who actually owns the dock currently and what types of incentives will be required to encourage them to allow the space to be used again. Beyond researching various ideas for what can be done with the dock, the students involved will probably think the project is quite boring and doesn't contain much content worthy of writing about, which is why this project cannot be recommended outright as a primary consideration.

Positive facts about the project are able to be found regardless of its shortcomings. The project will not cost much money in order to be completed, making it an excellent project for the school to invest in if they want to improve their image in the eyes of the local population. The project will also require the students involved to talk to the local government to obtain information, and learning how to properly set up a business meeting with a town official can be a valuable experience. The project can also be satisfying for those interesting in boating, on account that the result of the project will help someone interested in putting some form of boat on the water.

4.1.12. Housing and Building Space Issues

4.1.12.1. Overview:

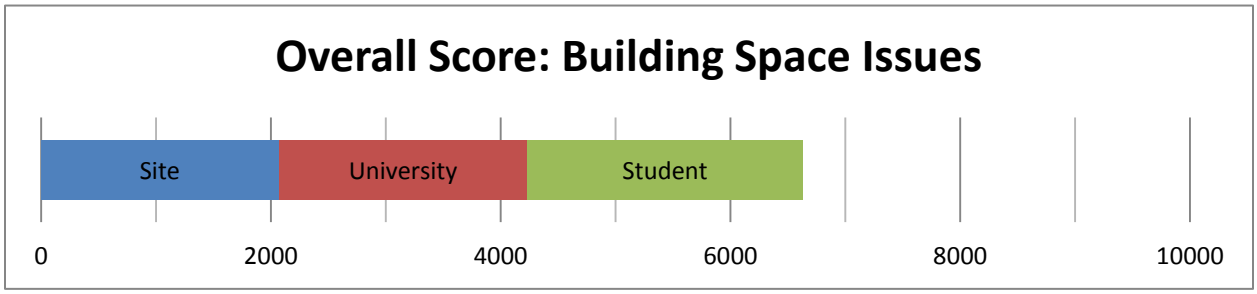

Figure 4.100

The high density population and development of Bar Harbor's tourism industry have created some problems with the infrastructure of the town. The town is densely packed into a small area of land, and the residents have run out of room to put in new buildings and parking facilities. This problem has caused the existing buildings to be in high demand and therefore always occupied, so there is no more room for expansion of businesses or apartments. This IQP is dedicated to finding solutions to these problems in order to assist the town's growth.

4.1.12.2. Statistics:

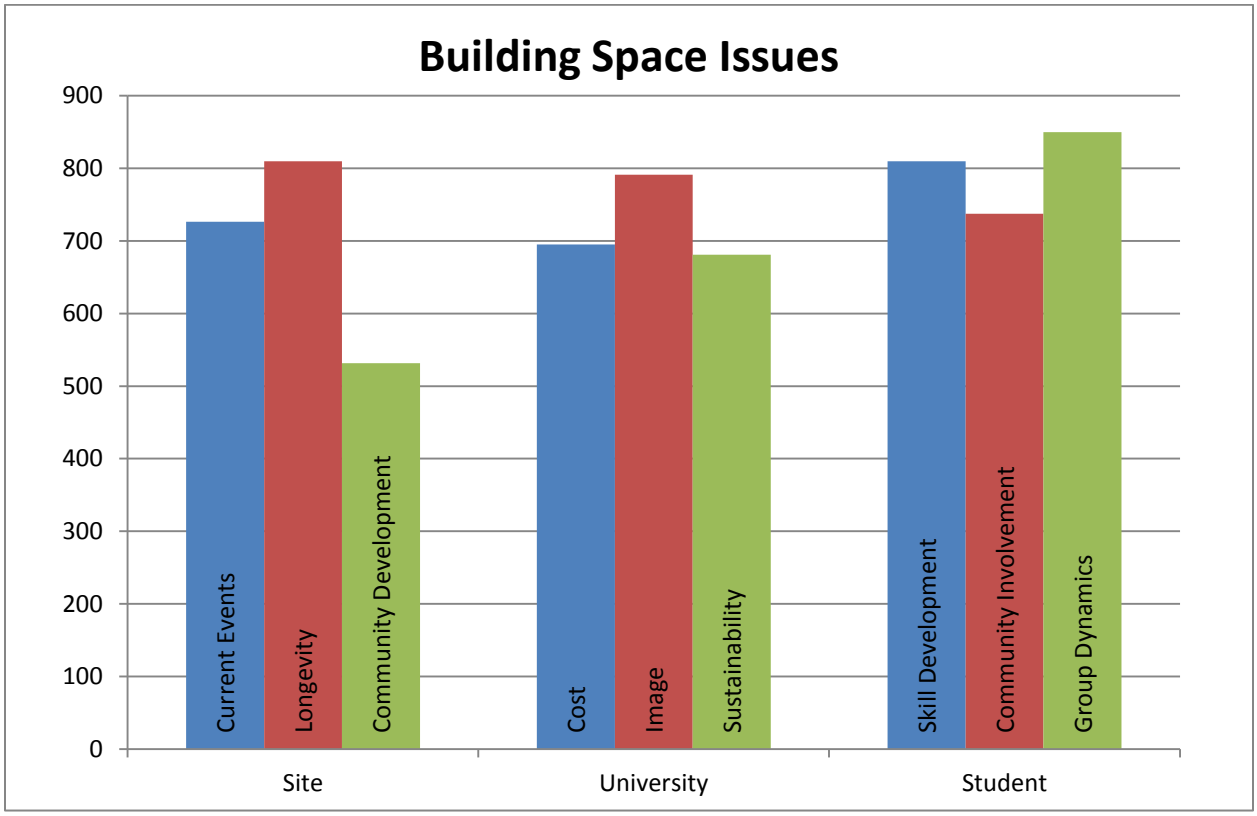

Figure 4.101

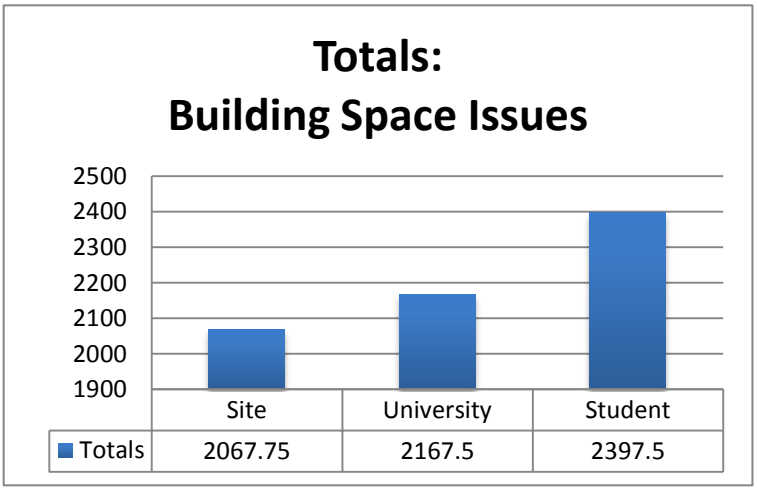

Figure 4.102

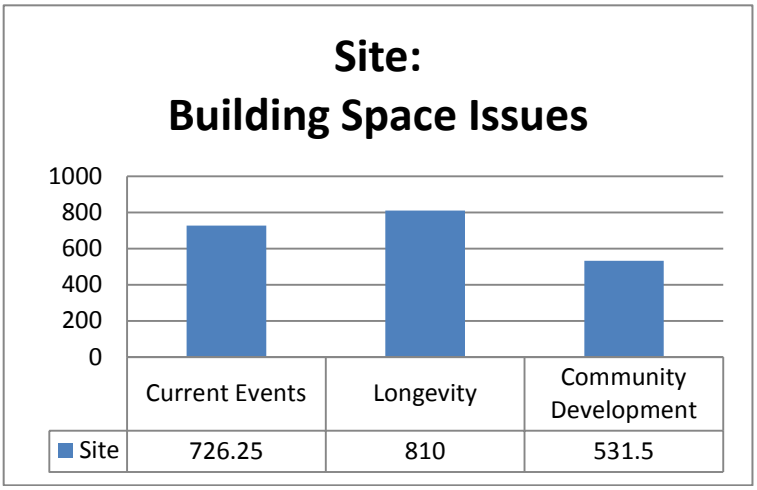

Figure 4.103

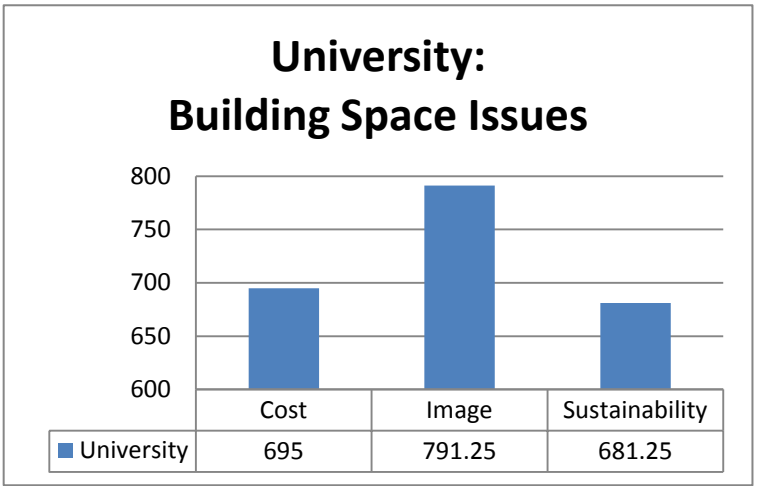

Figure 4.104

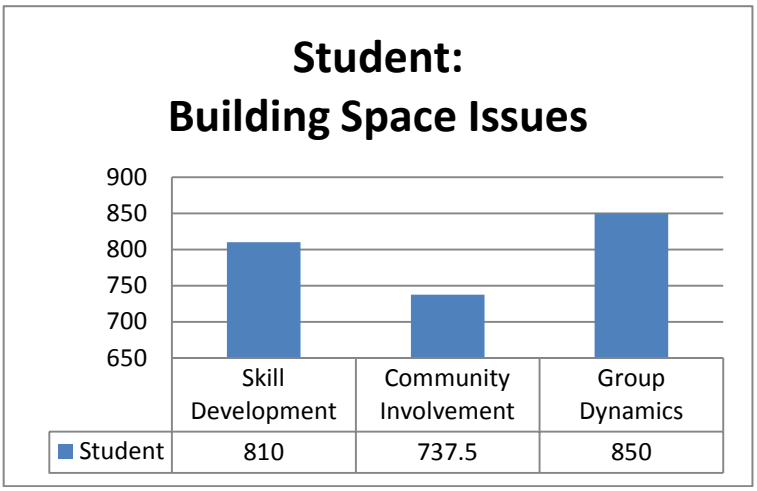

Figure 4.105

Site:

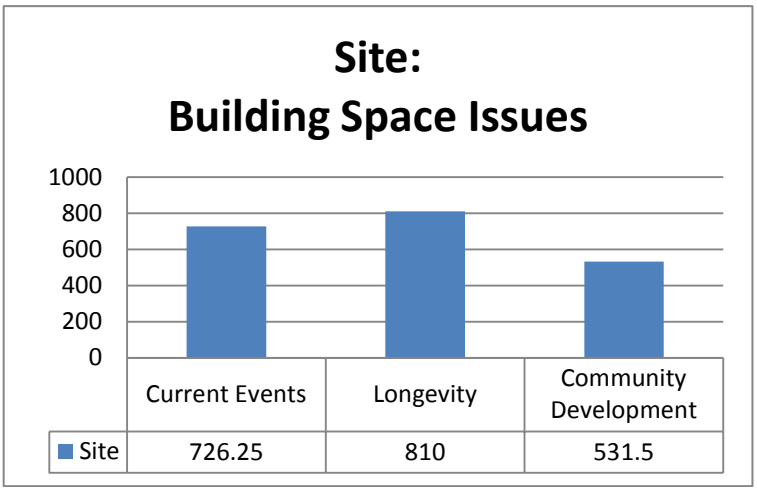

Figure 4.106

This IQP is phenomenal from the perspective of local businesses. Currently, there is no opportunity to expand within the town, and many business owners would be pleased to have the chance to buy more space. The opportunities provided to educate the community in some way are not as apparent. At best, some residents would learn about some aspects of architectural space efficiency or clarifications on local zoning laws. The IQP would help the local government because most of the residents here are looking to them to find a solution to the problem. If WPI students solved it, or at least researched possible solutions to the problem, it would decrease the government's workload so they could focus their energy elsewhere. The local environment would not be helped. In fact, any form of expansion of the town would increase the population density and the area of encroachment into the local wilderness, and so it has the potential to actively harm the environment slightly. Care and consideration must be undertaken by the students involved to avoid this scenario.

This IQP is expected to cover an acceptable amount of content required to be classed as a WPI graduation requirement. Students will need to cover the topics of zoning laws, town planning, architecture, social impacts of population density, impacts of population density in regards to tourism, and more. The actual implementation of the group's solution, if not covered

in time by the first group, is the only conceivable way this project could enable a new project. This project is also not very expandable. Once all of the possibilities are covered and researched by the first group, it does not allow much continuation by a second group.

This project does not focus on transportation issues in the town. It is possible that readjusting the town's useable space may lead to more organized traffic or safer roads, but this will not be a primary focus of effort. The project will improve the town's upkeep by opening possibilities for more efficient use of its useable space. The local traditional education facilities will not receive much benefit from this project. It takes years for major location changes in public educational facilities to take place because their administration is handled by the local government, and therefore any changes must meet public approval before moving forward.

4.1.12.3. University:

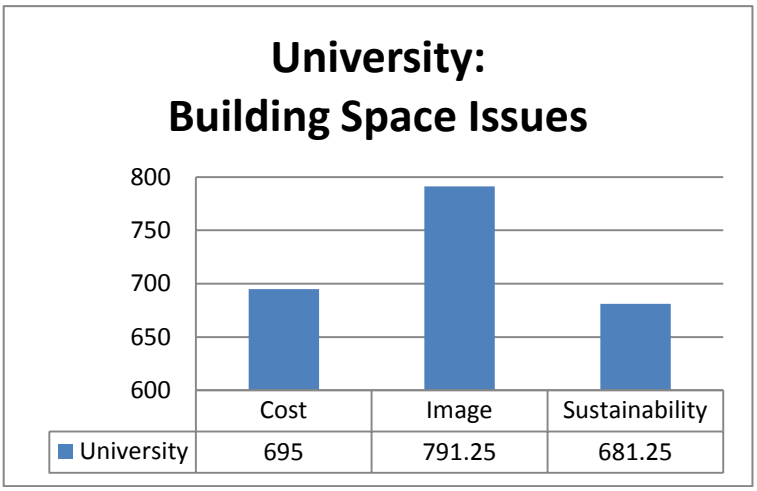

Figure 4.107

The school will receive standard tuition from the students of this project, and is considered average in this category. In terms of cost, the investment of time and effort into this problem will be well rewarded. In the long run, if Bar Harbor receives a boost to its local economy due to the research of this IQP, new unforeseen opportunities for WPI's project center may be opened. The work will also reflect well on the school's image in the area, which could sway the population to be more receptive to research being done in the area. This would allow for other projects to have an easier time conducting their studies. The primary sponsor for this project would be the local government, and work on this project may increase the receptiveness of the local government to sponsor additional projects.

This project cannot be seen as strictly humanitarian, but does contain some elements. Helping local business and enabling an expansion of the local population at no cost can easily be seen as humanitarian, but it does not directly enable the ability for the local population to help their community. This project could use some cutting edge techniques to improve the local electrical grid, but creating or utilizing cutting edge technology is not involved in this IQP. This IQP also does not assist green initiatives, and can only be a possibility if the team explicitly goes

out of their way to accomplish that goal into their solutions.

The project does not cover the use of reusable resources in a community. It could however be said that the project assists the sustainability of the housing market and businesses in the area. The project helps the region better use their space more efficiently, but does not provide better energy efficiency to the local population.

4.1.12.4. Student:

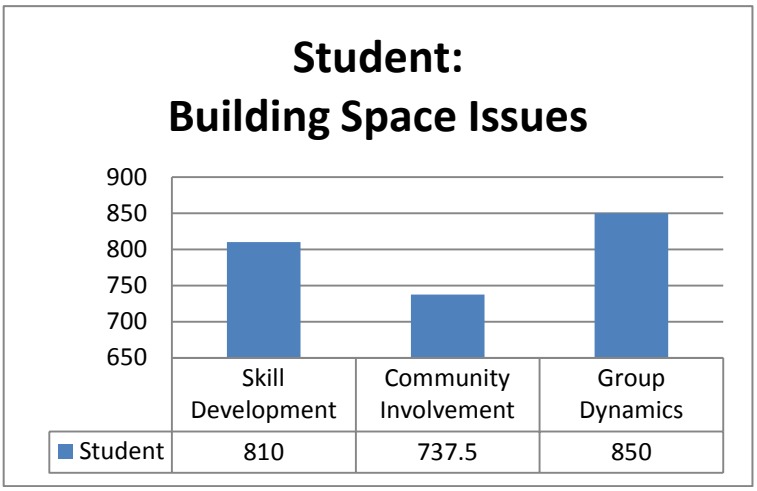

Figure 4.108

A wide range of students would be able to work on this project. Some prior knowledge about architecture and city planning may be helpful, but the basics could be covered during the student's PQP. The diverse amount of information expected to be gathered by this group requires them to be very organized for a desirable outcome of the project.

The students are expected to have a few meetings with the local government in order to gauge their needs and what they would like the students to focus on. However, beyond the government the students will not be required to have much interaction with the local population. It may seem that talking with the local business owners could help establish the needs of the community, but in truth any new space opened up within the town's city limits would help the population.

The students will learn more from this project than the average IQP, but the topics covered are limited. The students shall learn about city planning and how to rearrange space in efficient manners, but the project does not cover much else. The expected amount of data generated by the project's final outcome is not abnormally high or low.

4.1.12.5. Personal Analysis:

This project would be good to cover within the first couple years of the establishment of the Bar Harbor project center. The benefits of this project extend into the long term outlook of both the community and the project center, so it may be prudent for students to work on this project as soon as possible. Unfortunately, the project's ability to enable new projects is not one of the benefits provided. Therefore, the second year of the project center may be the best time to offer this project to student work.

This project may be fraught with problems that cannot be solved within the timeframe of seven weeks. The city planner would be the one to make the final call on any decisions regarding town layout and infrastructure, and governments are slow to implement new ideas compared to small businesses. The project also does not have the benefit of being able to write about the results of any implementation. At best, for results the students may speculate on what they think would best solve the town's problem, but they cannot provide actual proof behind their reasoning. In terms of feeling fulfillment from the project work, the student will not experience as much as a student working on a project that directly provides results would.

Positive aspects of the project include a well-defined objective and the potential solutions are generally unrestricted, allowing the students to be as creative as they desire. The long-term investment should not be underestimated due to the fact that the project will help everyone in Bar Harbor, greatly increasing WPI's presence in the area.

4.2. Housing Results

Due to tourism, housing in Bar Harbor has developed some unique problems. Most cottages available for rent are small and only offer weekly rentals during the summertime, causing extremely high demand among customers. Most apartments require a six month lease in order to rent, which is ideal for semi-permanent residents but not for seasonal vacationers. Some of the original ideas for housing students at Bar Harbor turned out to be impossible tasks to accomplish due to this situation. Other housing methods seem feasible, but require special considerations not found at other IQP site locations.

Renting an apartment in Bar Harbor is not feasible. Realtors in the area with apartments for rent may allow a two-month rental period for a single family, but for sixteen people or more the absolute minimum amount of time a property can be rented for is twenty-six weeks. Currently, WPI wants a location to house students through E-term and possibly A-term, which amounts to a maximum of four months where students will stay on site. Obviously, this constraint presents a large problem if no owner is willing to allow the institution to keep students on their property unless they pay for a six-month period. If a preference exists to renting apartments that are not on Maine's mainland, there are no reasonably priced options available if renting is the chosen path to house the students.

Renting a cottage or cottages also appears to be fiscally unfeasible as well improbable. Cottages on the island generally tend to be constructed on the oceanfront near major areas of interest and are, therefore, prohibitively expensive to rent. For instance, a cottage that can house eight people for six thousand dollars a week is quite common, which after eight weeks (one more than the seven week term due to the fourth of July break week) amounts to six thousand dollars per student. Additionally, the institution will also charge students extra in order to make a small

profit on the real estate, and asking a student to pay more than eight thousand dollars to be housed for half a summer on top of tuition is simply unreasonable.

Buying a property to own permanently is a surprisingly attractive option. Housing costs are currently low in Bar Harbor, while the rental costs remain very high. After purchasing the property and paying a few years' worth of taxes and maintenance, a body of sixteen or more students could theoretically pay off the costs. Additionally, while students are not living on the property, the space can be rented out for a very large profit margin. Providing further incentive, WPI would own and operate the property itself, meaning the university may freely and solely act upon any problems or expansion opportunities. Despite all of the pros to buying housing, there still exists the problem of guaranteeing that the property would be used during the off-season. According to Richard Vaz, the director of off campus project centers, any form of WPI housing absolutely must be in use at all times of the year, and thus any housing bought by the campus must come with that guarantee.

The College of the Atlantic is undoubtedly the best possible option for housing students during the summer months. The prices for staying on their campus are far less than ordinary rental costs for a cottage or apartment, and the living accommodations provide basic services to the residents similar to what WPI supplies to its own campus. They provide a meal plan to students staying on campus for the summer months as well, which can be a great boon for students that do not desire to cook their own meals. Housing is provided on a first come, first serve basis, so for the IQP center to be successful the housing accommodations here must be booked at least a year in advance to prevent another group from taking the housing needed for the project center. This housing option can supply housing for up to sixteen students.

The following section is an assessment of all researched housing possibilities on Mt.

Desert Island. Other opportunities are available, but many were not cost effective or were too distanced from the project center of Bar Harbor.

4.2.1. College of the Atlantic, 105 Eden Street, Bar Harbor, ME 01409

Brief:

This dormitory-style residence is located on College of the Atlantic, 105 Eden Street, Bar Harbor, ME 01409, approximately 0.9 miles from the center of town in a quiet area. The livable space is 1300 ft^2 and there are 4 fully furnished bedrooms, allowing for a maximum of 10 residents at one time. The location has a crime index rating of 1 and has approximately 10 parking spaces. Plumbing for the building's 2 bathrooms utilizes public sewer and water, utilities are included, and the maximum Internet bandwidth available is 88 Mb/s. The total cost of rent will be $200 per person per week.

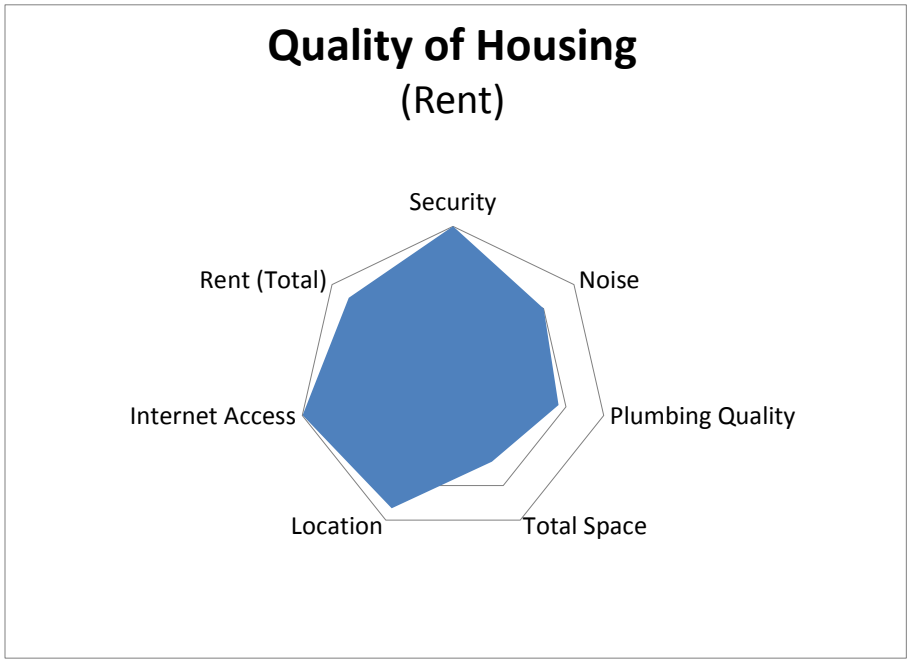

Figure 4.109

Personal Analysis:

The overall score the Peach House receives is relatively high compared to other housing options. The Peach House scores highly in important areas like rent, security, location, and Internet access while receiving average scores in other categories. The total livable space may

score low, but many dormitory-style housing situations will also have limited livable space. The plumbing quality is average due to drainage problems, but services remedied the situation promptly. Overall, the Peach House is an excellent housing opportunity in Bar Harbor, ME, and other living spaces at the College of the Atlantic should be highly considered.

4.2.2. SERC, Schoodic Point, Winter Harbor, ME 04693

Brief:

This dormitory-style residence is located on Schoodic Education and Research Center, Schoodic Point, Winter Harbor, ME 04693, approximately 46.8 miles from the center of town in a quiet area. The livable space is 1800 ft^2 and there are 5 fully furnished bedrooms, allowing for a maximum of 20 residents at one time. The location has a crime index rating of 1 and has approximately 20 parking spaces. Plumbing for the building's 4 bathrooms utilizes public sewer and water, utilities are included, and the maximum Internet bandwidth available is 50 Mb/s. The total cost of rent will be $300 per person per week.

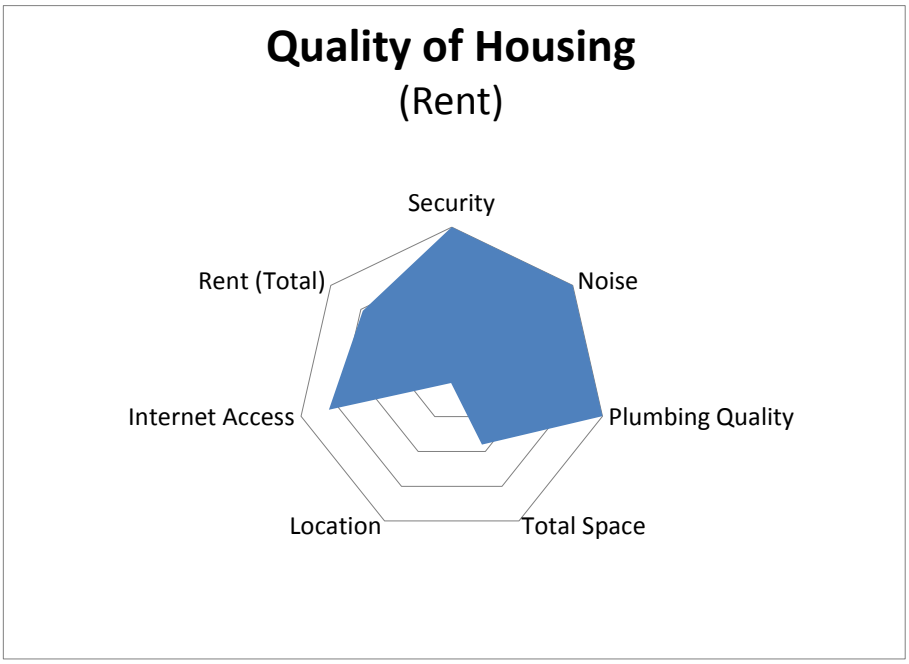

Figure 4.110

Personal Analysis:

The Schoodic Education and Research Center is an excellent housing opportunity for future projects on Mt. Desert Island. The living quarters this organization provides are

dormitory-style houses or apartments for over one hundred people if necessary. The facilities greatly resemble that of a college campus. However, one caveat about SERC is the location. Winter Harbor is located opposite to Bar Harbor on Mt. Desert Island. Both a ferry service and The Island Explorer travel between the two locations, but the feasibility of having project sites near Bar Harbor and housing located almost 50 miles away is unlikely. Projects would have to be created closer to SERC on the opposite side of the island compared to Bar Harbor. Overall, SERC is an excellent housing option, but projects must be centered around the area in order for that living option to be feasible.

4.2.3. 71 Eagle Lake Rd, Bar Harbor, ME 04609

Brief:

This house-style residence is located on 71 Eagle Lake Rd, Bar Harbor, ME 04609, approximately 3.5 miles from the center of town in a quiet area. The livable space is 2752 ft^2 and there are 4 unfurnished bedrooms, allowing for a maximum of 12 residents at one time. The location has a crime index rating of 1 and has approximately 6 parking spaces. Plumbing for the building's 3 bathrooms utilizes public sewer and water, and the maximum Internet bandwidth available at this location is 50 Mb/s. The overall cost will be $350000 with a yearly tax estimate of $3594.

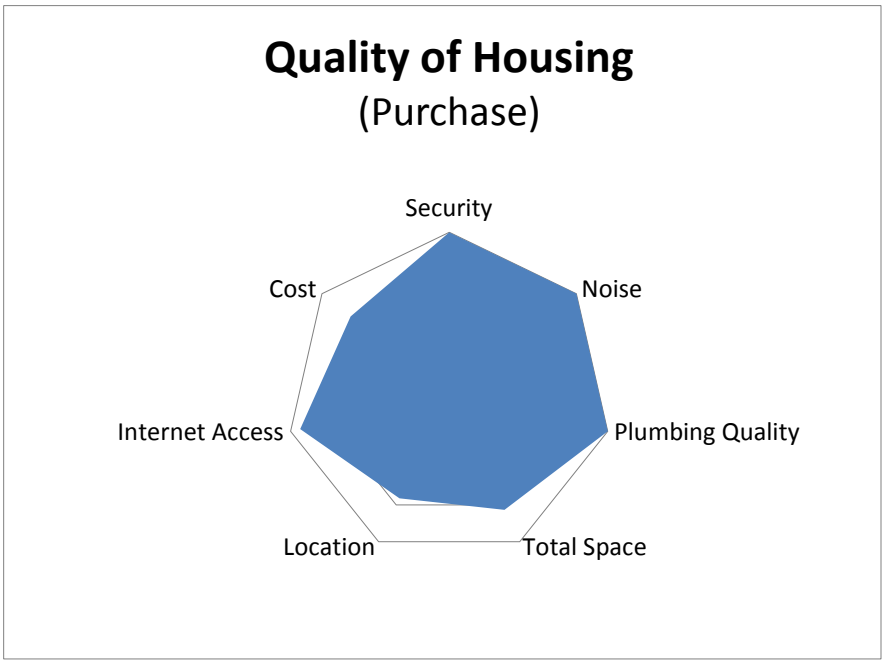

Figure 4.111

Personal Analysis:

Although this property is purchase only, it is also bank owned, so overall cost is most likely reasonable compared to other similar properties. The house is located on a main road, but

the driveway is set back and hidden enough to minimize traffic noise. Parking in back is suitable enough to fit up to ten cars if necessary, especially with the two-door parking garage. Inside the house is a general common area sufficient for group meetings, and the location allows students to travel to and from town quickly and easily.

4.2.4. 6 Prospect Ave, Bar Harbor, ME 04609

Brief:

This commercial-style residence is located on 6 Prospect Ave, Bar Harbor, ME 04609, approximately 3.5 miles from the center of town in a noisy area. The livable space is 4290 ft^2 and there are 7 partially furnished bedrooms, allowing for a maximum of 21 residents at one time. The location has a crime index rating of 2 and has approximately 24 parking spaces. Plumbing for the building's bathrooms utilizes public sewer and water, and the maximum Internet bandwidth available at this location is 50 Mb/s. The overall cost will be $650000 with a yearly tax estimate of $5854.

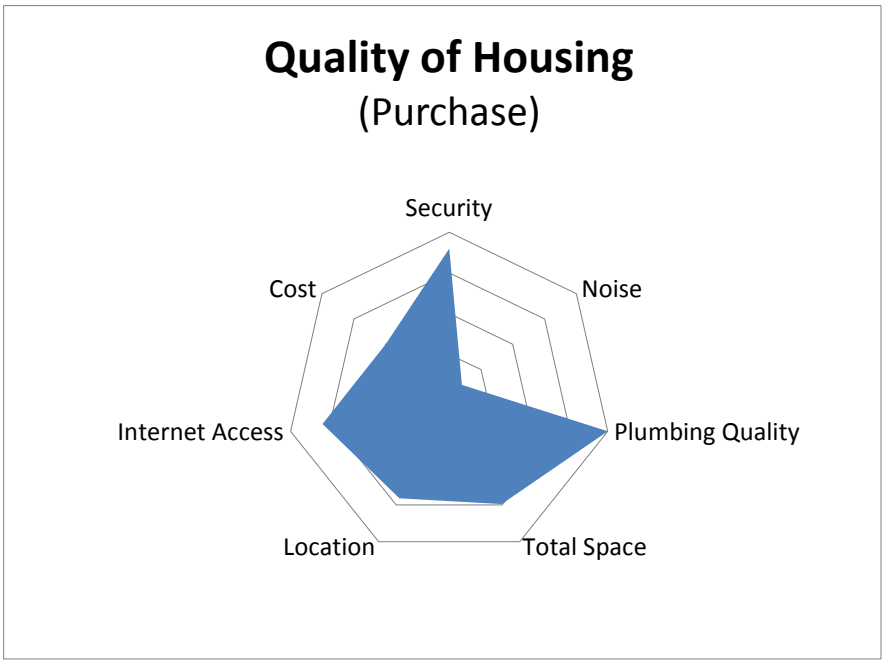

Figure 4.112

Personal Analysis:

Although originally a funeral home, this property still offers many amenities the other buildings do not. For example, the building is completely air-conditioned and the lot outside can

fit over 20 cars. The extra lot space also allows for possible expansion. However, the inside will need renovations in order to create actual bedrooms and common areas. Fortunately, reconstruction will not be difficult because the current common rooms are of ample size. The location is on a main road, so noise could be a factor during the day, but the town is also less than one mile away.

4.2.5. 108 West Street, Bar Harbor, ME 04609

Brief:

This apartment-style residence is located on 108 West Street, Bar Harbor, ME 04609, approximately 0.5 miles from the center of town in a noisy area. The livable space is 3355 ft^2 and there are 7 partially furnished bedrooms, allowing for a maximum of 21 residents at one time. The location has a crime index rating of 2 and has approximately 10 parking spaces. Plumbing for the building's 6 bathrooms utilizes public sewer and water, and the maximum Internet bandwidth available at this location is 50 Mb/s. The overall cost will be $585000 with a yearly tax estimate of $6019.

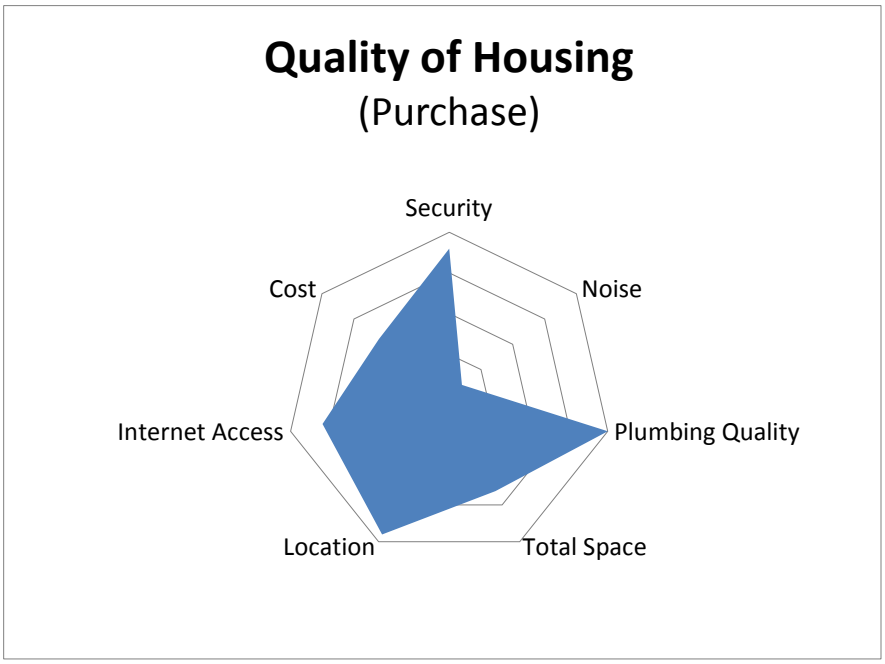

Figure 4.113

Personal Analysis:

This property has many advantages, especially for housing over ten people. The center of town is a one-minute walk away and there is parking for over ten vehicles. The building holds

six separate apartments with seven bedrooms and six bathrooms. Some basic amenities are included and the building runs on town sewer. The most important factor is this building's availability to rent. Although rent must be for at least six months, cost will be significantly lower than other cottages or smaller apartments. The interior does require some work due to resident use for over one hundred years, but those costs will be minimal when compared to other properties.

4.2.6. 760 Norway Drive, Bar Harbor, ME 04609

Brief:

This house-style residence is located on 760 Norway Drive, Bar Harbor, ME 04609, approximately 4.8 miles from the center of town in a quiet area. The livable space is 2484 ft^2 and there are 4 unfurnished bedrooms, allowing for a maximum of 12 residents at one time. The location has a crime index rating of 1 and has approximately 10 parking spaces. Plumbing for the building's 3 bathrooms utilizes a septic system, and the maximum Internet bandwidth available at this location is 50 Mb/s. The overall cost will be $350000 with a yearly tax estimate of $3324.

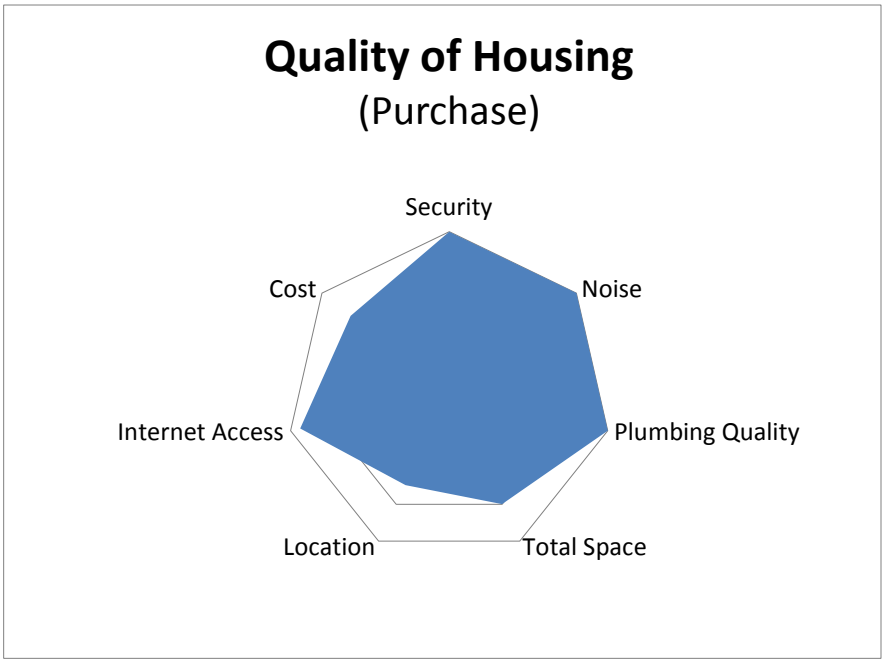

Figure 4.114

Personal Analysis:

This property is located slightly further from town than the other properties, so walking or biking to the center would take much time. The house also runs on a septic system, which could possibly cause problems with over ten students using water for showers and dishes every

day. Aside from the location and plumbing, this house is extremely similar in size and style to the house on Eagle Lake Road. The driveway is set back, the lot size will fit a sufficient amount of cars, and the common area is great for group meetings.

4.3. Sponsor Results

Analysis of potential sponsors was based upon a questionnaire covering a range of topics. In order to avoid placing a personal bias on the rankings, the rankings were based on yes or no questions or raw, non-subjective data. Below is a list of potential sponsors with their history, likelihood of sponsorship, and contact information.

4.3.1. Acadia Senior College

4.3.1.1. Brief:

Acadia Senior College is an organization with one (See further Information) employee(s) that specializes in higher education and does not have a history of sponsorship. Acadia Senior College is a non-profit organization that does not have workspace available for students. Acadia Senior College has not made their interest in sponsorship evident.

4.3.1.2. History:

Acadia Senior College was founded in the spring of 2000 under the sponsorship of the University College at Ellsworth (Cole, Acadia Senior College, 2011). The Acadia Senior College was created to enable older persons to attain further education, have social interaction, and open the community to fun. Since its founding, the college has seen an enrollment of over one thousand students, and continues to use a mostly volunteer based staff. Since the college operates via a volunteer based staff, the college only has one part time employee who works as an Office Administrator. Currently the Acadia Senior College partners with the College of the Atlantic in Bar Harbor.

4.3.1.3. Potential Project Work:

As an educational institution, the Acadia Senior College has a variety of opportunities for project work. Due to the volunteer based staff, and having only one employee on payroll, some of their necessary infrastructure work may lag behind competition. WPI students could work to improve the presence of the college in the community, both online and off, or work help establish a technology education program. The college is open to volunteers who staff the offices, perform guest lectures, and manage finances. While doing work for ASC, students would be thoroughly involved in the local community. If the Acadia Senior College does sponsor

projects, the opportunity for ongoing projects exists, and these projects would allow WPI to quickly establish a positive image amongst the community.

4.3.1.4. Contact Information:

Phone:
(207) 288-9500
Email:
acadiaseniorcollege@coa.edu

Physical Address:
Gates 104
College of the Atlantic
Bar Harbor, Maine 04609

Website:
http://www.acadiaseniorcollege.org

4.3.2. Bar Harbor BioTechnology

4.3.2.1. Brief:

Bar Harbor BioTechnology is an organization with fifty employee(s) that specializes in developing innovative molecular biology products and services that advance life science research and clinical medicine and does not have a history of sponsorship. Bar Harbor BioTechnology is a for-profit organization that does not have workspace available for students. Bar Harbor BioTechnology has not made their interest in sponsorship evident.

4.3.2.2. History:

Bar Harbor BioTechnology Inc. was founded in 2006 as a commercial spin-off of The Jackson Laboratory (Bar Harbor BioTechnology, 2012). BHB researches life science and clinical medicine in an effort to improve the quality of life amongst humans. The company's methods of pinpointing specific genes affected by a disease of interest allow scientists to develop a medicine specific to that gene. BHB is among the highest represented organizations specializing in quantitative polymerase chain reaction (qPCR) and strive to make molecular profiling easier and more efficient. BHB's development of real-time PCR will continue to serve as a gene researcher's most useful tool in determining affected cells and in creating treatments for gene-specific diseases.

4.3.2.3. Potential Project Work:

Bar Harbor Biotechnology Inc. specializes in the process of molecular profiling, meaning most possible projects associated with the company will specifically relate to some form of genetic research. Developing an IQP related to this subject may be difficult; however, forming an MQP site for students majoring in a field involving genetic research is an excellent possibility. BHB-sponsored projects would hold many similarities to past projects held at the University of

Massachusetts Medical School in Worcester. Students focusing on careers related to disease research could broaden their knowledge of the subject and refine their skills through an MQP project sponsored by BHB.

4.3.2.4. Contact Information:

Phone:
(207) 667-7900
Email:
info@bhbio.com

Physical Address:
18 River Field Road
Trenton, ME 04605

Website:
http://www.bhbio.com

4.3.3. College of the Atlantic

4.3.3.1. Brief:

College of the Atlantic is an organization with forty four employees that specializes in higher education and has a history of sponsoring projects. College of the Atlantic is not a non-profit organization that has workspace available for students. College of the Atlantic has not made their interest in sponsorship evident.

4.3.3.2. History:

Chartered in 1969, College of the Atlantic was the first United States college to focus on one encompassing major: human ecology (College of the Atlantic, 2012). The first class admitted in 1972 based its research solely on the relationship between humans and the environment in order to emphasize active learning and the importance of understanding one's surroundings. The university's dynamic has remained the same over the years. Students continue to explore their minds and design their own challenging independent studies. The CoA's close connection to Acadia National Park only compliments the students' ability to interact with their surrounding environment. This emphasis on broadening one's involvement with the community gives students the capability to truly make a difference in the world.

4.3.3.3. Potential Project Work:

The College of the Atlantic mainly focuses on the importance between humans and the environment. Therefore, many potential projects will focus on environmental sustainability and community development. Much of the work students perform is directly related to typical IQP studies. Some of these studies many include research about specific aspects of Acadia National Park, community issues, or general societal improvements. The CoA already sponsors summer projects for high school students and younger children who have an interest in their local

environment. A potential WPI IQP project may involve assisting in these current projects or helping to create new projects for the community. WPI students could even suggest improvements to current projects or ways of improving sustainability. The CoA offers a broad range of potential projects and is a great resource for the future of the Bar Harbor IQP site.

4.3.3.4. Contact Information:

Phone:
(207) 288-5015

Email:
inquiry@coa.edu

Physical Address:
105 Eden Street
Bar Harbor, ME 04609

Website:
http://www.coa.edu/index.htm

4.3.4. The Jackson Laboratory

4.3.4.1. Brief:

The Jackson Laboratory is an organization with one thousand four hundred employee(s) that specializes in mammalian genetics research to advance human health and has a history of sponsoring projects. The Jackson Laboratory is a non-profit organization that has workspace available for students. The Jackson Laboratory has not made their interest in sponsorship evident.

4.3.4.2. History:

After holding his first summer lab sessions with students in 1923, Clarence Cook Little, the former president of the University of Maine and University of Michigan, founded the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Maine in 1929 (The Jackson Laboratory, 2012). Since the Jackson Laboratory's founding, it has grown from a handful of employees hosting students in the summer to a massive organization dedicated to discovering the genetic basis for preventing, treating and curing human disease, and enabling research and education for the global biomedical community. The Jackson Laboratory now consists of one thousand three hundred sixty eight employees, of which many have Ph.D's, M.D.s, and D.V.M.s who research cancers, computational biology and bio informatics, developmental and reproductive biology, immunology, metabolic diseases, and neurobiology. Each summer the Jackson Laboratory hosts high school students to help them "understand the nature of research science" and also offers college students internships for research.

4.3.4.3. Potential Project Work:

The Jackson Laboratory presents high opportunity for project sponsorship due to its immense history of sponsorship. The Projects that the Jackson Laboratory may sponsor range

from all varieties of biology and medicine to environmental research. Despite high involvement in the sponsorship scene, the Jackson Laboratory's material may be unsuitable to the project types sought after for IQP work, but rather MQP Work.

4.3.4.4. Contact Information:

Phone:
(207) 288-6000

Email:
pubinfo@jax.org

Physical Address:
600 Main Street
Bar Harbor, Maine 04609

Website:
http://www.jax.org

4.3.5. Mount Desert Island Biological Laboratory

4.3.5.1. Brief:

Mount Desert Island Biological Laboratory is an organization with 45 employees that specializes in marine and biomedical research and has a history of sponsoring projects. Mount Desert Island Biological Laboratory is a non-profit organization that has workspace available for students. Mount Desert Island Biological Laboratory has not made their interest in sponsorship evident.

4.3.5.2. History:

Originally the Tufts Summer School of Biology at South Harpswell, the Mount Desert Island Biological Laboratory was founded in 1898 by Professor J.S, Kingsley of Tufts College (MDIBL, 2009). Early work at the labs consisted of anatomy and embryology of marine species and plants. Since its founding, MDIBL has continued research in many disciplines within biology, and anatomy including kidney research, developmental and cell biology, cellular and epithelial physiology, environmental pollution from fuels and toxins, cell metabolism, fluid and ion transport, and toxicology. Mount Desert Island Biological Laboratory move from its original location in 1921 to its current location at Salisbury Cove on Frenchman Bay. The organization has, in the past decade, grown dramatically.

4.3.5.3. Potential Project Work:

The Mount Desert Island Biological Laboratory is an exciting prospect for potential projects. The Laboratory is a non-profit research institution, and would probably be very excited to have student help with research and data gathering. Students could assist the scientists in the creation of new regenerative medicines based off of marine life. Health studies and research involving marine life could also come to fruition. It is plausible that this institution would

support both IQP and MQP type projects.

4.3.5.4. Contact Information:

Phone:
(207) 288-3605

Email:
mdibl_info@mdibl.org

Physical Address:

Old Bar Harbor Rd.
Salisbury Cove, ME 04672

Website:
http://www.mdibl.org

4.3.6. Schoodic Education and Research Center (SERC)

4.3.6.1. Brief:

Schoodic Education and Research Center is an organization with 32 employees that specializes in research and education with Acadia National Park and has a history of sponsoring projects. Schoodic Education and Research Center is a non-profit organization that has workspace available for students. Schoodic Education and Research Center has not made their interest in sponsorship evident.

4.3.6.2. History:

Established in 2004 as a nonprofit research organization of Acadia National Park, the Schoodic Education and Research Center (SERC) aims to guide younger generations to a better understanding of their surrounding environment (SERC, 2010). The facility is located in Winter Harbor, ME, on a former Navy Base and encompasses over eighty acres of forest. The largest of about twenty research learning centers in the United States, SERC provides essential knowledge about the importance of the natural world. Acadia National Park greatly assists in creating numerous learning opportunities each year, and SERC's impact on understanding the balance between nature and humans will continue to grow throughout the coming years.

4.3.6.3. Potential Projects:

Similarly to the College of the Atlantic, SERC is a main proponent of conserving our nation's wildlife. Much of the organization's work involves research in or around Acadia National Park. Projects generally focus on learning about the impact of certain actions on the wildlife of Acadia or physically improving the park and maintaining the forests and ecosystems. Possible projects would include each of these topics. Students could research the well-being of certain areas of the park and possibly offer methods of improving the environment of those areas. Students could also help restore many of the ecosystems of the area and help keep the wildlife

secure through their research. SERC already sponsors countless projects maintaining Acadia National Park, so finding a possible project would simply consist of contacting SERC and inquiring for a possible project.

4.3.6.4. *Contact Information:*

Phone:
(207) 288-1310

Email:
Online Form: http://www.sercinstitute.org/about/contact-us

Physical Address:

64 Acadia Dr.
Winter Harbor, Maine 04693

Website:
http://www.sercinstitute.org

4.3.7. MERI Center for Marine Study

4.3.7.1. Brief:

MERI Center for Marine Studies is an organization with 18 employees that specializes in marine education and research to help protect marine life and does not have a history of sponsorship. MERI Center for Marine Studies is a non-profit organization that has workspace available for students. MERI Center for Marine Studies has not made their interest in sponsorship evident.

4.3.7.2. History:

Founded in 1990 by Dr. Susan Shaw, the Marine Environmental Research Institute (MERI) Center for Marine Study is a nonprofit organization aiming to provide understanding about and protection to the marine life of the Atlantic and Pacific coasts of North America (Marine Environmental Research, 2012). Similarly to what SERC does for Acaida, MERI researches the effects of human pollution and interference on aquatic wildlife. MERI strives to provide worldwide awareness of marine mammals through research programs, education, and ecosystem monitoring. MERI's work is indispensable when understanding the effects of pollution on maritime wildlife, especially when the younger generation is the main audience to educate. The new generation will be responsible for maintaining the natural ecosystems of the oceans, and MERI hopes to educate everyone on how to protect these fragile environments.

4.3.7.3. Potential Projects:

MERI hosts research projects focusing on sustaining and improving aquatic life along the Atlantic and Pacific Coasts of the United States. The organization monitors the coast for pollution and any effects that pollution may have on the encompassing marine wildlife. Possible projects may include assisting MERI in monitoring these ecosystems or researching ways in preventing pollution. Students could spread awareness on the issue to the general public in a

more effective manner. Any project relating to marine wildlife protection and awareness will gain the attention of this dedicated organization, and each project will greatly help our aquatic wildlife.

4.3.7.4. Contact Information:

Phone:
(207) 374-2135

Email:
info@meriresearch.org

Physical Address:

55 Main Street, PO Box 1652
Blue Hill, ME 04614

Website:
http://www.meriresearch.org

4.3.8. Bar Harbor Historical Society

4.3.8.1. Brief:

Bar Harbor Historical Society is an organization with 14 employees that specializes in documentation of the history of Bar Harbor and does not have a history of sponsorship. Bar Harbor Historical Society is a non-profit organization that has workspace available for students. Bar Harbor Historical Society has not made their interest in sponsorship evident.

4.3.8.2. History:

The idea to form the Bar Harbor Historical Society, a nonprofit and educational organization, began in 1945 in the Jesup library about a year after the passing of the father of Acadia National Park George B. Dorr (Bar Harbor Historical Society, n.d.). The scheme continued successfully for one year until a room was set aside in the library in order to exhibit the town's historic documents. The collections in the library continued to grow over the years, and in 1997 the society purchased their current residence on 33 Ledgelawn Avenue. Even today, the many displays pictures, documents, and antique clothing continue to expand. The Bar Harbor Historical Society also offers significant historical information of important events in the past in order to preserve the complex history and culture of the surrounding community.

4.3.8.3. Potential Projects:

As an educational organization, the Bar Harbor Historical Society could offer many projects relating to preserving the history and culture of the town. Students could research and monitor any significant events in town and document them, or students could help the historical society develop its online presence. The organization already offers special events about the history of the area, so a project could involve offering improvements and more advertisements in order to gather a larger crowd. The culture in Bar Harbor is filled with rich history and incredible immersion opportunities for any student-oriented project.

4.3.8.4. Contact Information:

Phone:
(207) 288-3807

Email:
bhhistorical@gwi.net

Physical Address:

33 Ledgelawn Ave.
Bar Harbor, Maine 04609

Website:
http://www.barharborhistorical.org

4.3.9. Friends of Acadia

4.3.9.1. Brief:

Friends of Acadia is an organization with 3000 employees that specializes in protection of Acadia National Park and does not have a history of sponsorship. Friends of Acadia is a non-profit organization that does not have workspace available for students. Friends of Acadia has not made their interest in sponsorship evident.

4.3.9.2. History:

Friends of Acadia was founded in 1968 as a 501(C)(3) non-profit, charitable organization (Friends of Acadia, 2011). Since its founding, Friends of Acadia has worked to fulfill its mission of protecting, preserving, and promoting the stewardship of the outstanding natural beauty, ecological vitality and distinctive cultural resources of Acadia National Park and its surrounding communities for the inspiration and enjoyment of current and future generations. Friends of Acadia raise private funds for the park and communities, such that the park can be well kept and defended from threats, and improve services in the park. With its funds, Friends of Acadia maintains the carriage roads, made new foot paths through the national park, co-developed fare free public transit, and has sponsored several programs over the years.

4.3.9.3. Potential Projects:

Friends of Acadia is a prime organization to attain sponsorship from due to its direct involvement with the Acadia National Park. Sponsorship opportunities exist for projects already begun, including the trail team, and the sound design team, but the possibilities are not limited to this. Potential work could involve work side by side with the members of Friends of Acadia, and could address the problems with ongoing maintenance to carriage trails, terraforming, and soil condition in popular hiking areas. Students could work to collect data pertinent to the organization, and provide it to them in a way that makes their work easier.

4.3.9.4. Contact Information:

Phone:
(207) 288-3340

Email:
info@friendsofacadia.org

Physical Address:
43 Cottage St
Bar Harbor, Maine 04609

Website:
www.friendsofacadia.org

4.3.10. Abbe Museum

4.3.10.1. Brief:

Abbe Museum is an organization with 20 employees that specializes in historical preservation and education and does not have a history of sponsorship. Abbe Museum is a non-profit organization that has workspace available for students. Abbe Museum has not made their interest in sponsorship evident.

4.3.10.2. History:

Like other nonprofit, educational, and town centered organizations, the Abbe Museum offers many opportunities for its patrons (Cole, Abbe Museum: Inspiring New Learning About the Wakanaki Nations With Every Visit, 2012). Each year, the museum sponsors a variety of volunteer internships for high school and college students. Most internships center around anthropology, archaeology, Native American Art, or some history subject, so students specializing in those majors are highly encouraged to apply for an internship. The museum also offers programs for younger children to educate them about the Wabanaki Indians of Maine. Aside from the public programs, the museum is open for regular visits for pure curiosity.

4.3.10.3. Potential Projects:

The Abbe Museum already offers learning programs for younger children and internship opportunities for high school and college students. Students interested in Native American art, archaeology, or some other history subject, then the museum could offer some form of internship depending on their needs. The museum is an excellent tool for learning about Maine's past, specifically the past of the Wabanaki Indians. Students could even help the museum run these programs or offer improvements to the quality of learning presented at them.

4.3.10.4. Contact Information:

Phone:

(207) 288-3519

Email:
info@abbemuseum.org

Physical Address:
26 Mount Desert Street
Bar Harbor, ME 04609

Website:
http://www.abbemuseum.org

4.3.11. Maine Island Trail Association

4.3.11.1. Brief:

Maine Island Trail Association is an organization with 25 employees that specializes in water trail construction and coastline preservation and does not have a history of sponsorship. Maine Island Trail Association is a non-profit organization that does not have workspace available for students. Maine Island Trail Association has not made their interest in sponsorship evident.

4.3.11.2. History:

The idea for the Maine Island Trail Association began in the 1970s when the state realized there were over 1300 unclaimed islands, rocks, ledges, and low-land bars along the coast (Main Island Trail Association, n.d.). The Maine Island Trail was founded in 1987 in an effort to display these land masses to the public, and in 1988 MITA began in an effort to protect these very islands and ledges. MITA's mission directly states, "The Maine Island Trail Association's goal is to establish a model of thoughtful use and volunteer stewardship for the Maine islands that will assure their conservation in a natural state while providing an exceptional recreational asset that is maintained and cared for by the people who use it." Most of the islands are now privately owned, but many are still open to the public for exploration. Regardless, MITA does an incredible job protecting the wildlife of the islands and the structure of the islands themselves while allowing the public to enjoy the wonders these islands have to display.

4.3.11.3. Potential Projects:

The Maine Island Trail Association has great potential to be an excellent project sponsor for environmental-based projects in Bar Harbor. The trail itself does not include Bar Harbor but does include many of the islands surrounding Bar Harbor. Students could potentially research these trails and map them interactively online. Students could also map the many important sites

on specific islands along the trail. The trail offers a variety of outdoor experience, along with opportunity for the introduction of technology to these islands. People could use the students' work to view the islands beforehand and choose which one or ones they want to visit. MITA is a great opportunity to research and visit the many islands of the coast of Maine.

4.3.11.4. Contact Information:

Phone:
(207) 761-8225

Email:
info@mita.org

Physical Address:
58 Fore Street
Suite 30-3
Portland, Maine 04101

Website:
http://www.mita.org

4.3.12. Jesup Memorial Library

4.3.12.1. Brief:

Jesup Memorial Library is an organization with 6 employees that specializes in information preservation and does not have a history of sponsorship. Jesup Memorial Library is a non-profit organization that has workspace available for students. Jesup Memorial Library has not made their interest in sponsorship evident.

4.3.12.2. History:

The Jesup Memorial Library is a nonprofit organization run solely by volunteer community members (Jesup Memorial Library, 2006). Like any library, thousands of books, videos, and articles are available for rent for the community. The library also holds events for younger people in the community teaching them simple computer and reading skills. The library also helped found the Bar Harbor Historical Society in the 1940s. Today, the community continues to utilize the library for literary resources and donate countless hours of service and money in order to sustain the organization.

4.3.12.3. Potential Projects:

Being a nonprofit organization run by volunteers, the Jesup Memorial Library would most likely enjoy help whenever they can get it. Complimentary services for any nonprofit organization are extremely beneficial. Students could benefit the library by holding collection services or informational sessions. Students could also add to the interlibrary loan system the library offers. Each possible project would benefit the community, especially the youth participating in library-sponsored educational programs.

4.3.12.4. Contact Information:

Phone:

(207) 288-4245

Email:
Not Available

Physical Address:
34 Mt. Desert Street
Bar Harbor, Maine 04609

Website:
http://www.jesup.lib.me.us

5. Conclusions and Recommendations

There exists a suitable amount of project work on Mount Desert Island to warrant an IQP center. Five projects were found to be ideal for work over the next few years from the publishing of this writing, and there exist many more potential projects to work on after the most ideal projects are completed. The projects cover a wide range of topics, allowing for student diversity and a sense of project worth. A surprising number of potential projects work with the town government in some way, and a good relationship with the local government can be very beneficial to sustaining a project center. Therefore, helping the government with project work bodes well for the future of the project center.

A large number of potential sponsors were also located within Mount Desert Island. There exist many promising organizations that focus on sponsoring project work in general on the Island, including Friends of Acadia and Mount Desert Island Biological Laboratory. The existing stature of WPI is expected to greatly help the university negotiate project sponsorships with these organizations and will help ensure the students will always have the resources they need to complete project work on the Island. Many other potential sponsors that focus on other topics than project work may still be interested in the work WPI students accomplish, and many residents around the island will see results from the mutually beneficial relationships WPI can make with local sponsors.

Finding appropriate housing for students on the Island was tough, and only two locations were deemed plausible for a project center. The main problem that the group encountered during the research occurred after a meeting with the town's building inspector. Very few areas around the Island had appropriate zoning laws for allowing students to work on projects under the university, and most of those places were already in use by other organizations or were not

suitable for student living. This hindrance severely limited the university's choices in housing and negated some previous housing options because they were located outside of the specific dormitory zones. With all of the facts taken into account, the only fully researched housing possibility the group was able to find was to continue the housing agreement made for The College of the Atlantic. The buildings are zoned and inspected properly for student use and the university is one of the most cost effective solutions to renting rooms on the Island. The already well-established relationship between WPI and CoA works well for the use of CoA's campus as summer housing for project work. One forewarning about CoA is that their summer program housing is booked on a first come, first serve basis. WPI should be proactive in housing reservations because housing spaces could fill at any time.

The Schoodic Education and Research Center offers one other possible housing solution on the island. S.E.R.C. has the capacity to comfortably house well over one hundred students at a time on their campus, and the facility is properly zoned and inspected for student use. Unfortunately, events outside of the project group's control did not allow the group to contact S.E.R.C. to gather enough information about them to do a full analysis on their housing solution. The group's advisor did manage meet with S.E.R.C. near the end of the project, and the organization has expressed interest in housing students for either summer work or into A-term. One potential caveat to this solution is the association's location on the island. Whereas CoA is situated near Bar Harbor and other popular tourist areas, S.E.R.C. is part of the most rural areas on Mount Desert Island. Projects well suited to working in the populated areas on the island may suffer accordingly. However, projects that require the students to work in deep wilderness on the island will benefit greatly, so any the projects done at S.E.R.C. should certainly take location into consideration.

By analyzing the data gathered by this project group, the group concluded that Bar Harbor is a suitable location for a WPI IQP center. All on-site requirements for a project center are met on Mount Desert Island, and many students would be interested in doing a project in the scenic landscape of the island.

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7. Appendix A – Project Forms

7.1. Additional Revenue Town

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	89	2.5	222.5	796.875
		Education	50	2	100	
		Government	90	1.5	135	
		Enviornment	45	4	180	
	Longetivity	Amount of Content	72	2	144	636
		Enables other Projects	35	4	140	
		Expandable	35	4	140	
	Community Development	Transit	50	3.5	175	466
		Town Upkeep	60	3.5	210	
		Education	27	3	81	
University	Cost	Tuition	50	3	150	710
		Investment	80	4	320	
		Sponsor	80	3	240	
	Image	Humanitarian	36	3.5	126	657.75
		Cutting Edge	45	2.5	112.5	
		Green	50	4	200	
	Sustainability	Renewability	50	5.5	275	630.625
		Efficiency	51	4.5	229.5	
Student	Group Dynamics	Diversity	89	4.5	400.5	879
		Organization	87	5.5	478.5	
	Community Involvement	Gov/People	94	4.5	423	941.25
		Non-WPI Interaction	60	5.5	330	
	Skill Development + Presence	Educational Value	62	5	310	990
		Qual + Quant of Data	70	5	350	
Project Title:	Additional Town Revenue			Total Score:	5473	6707.5

Figure 7.1

7.2. Enhancing Town Boating Docks

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	80	2.5	200	732.5
		Education	62	2	124	
		Government	68	1.5	102	
		Enviornment	40	4	160	
	Longetivity	Amount of Content	57	2	114	729
		Enables other Projects	56	4	224	
		Expandable	37	4	148	
	Community Development	Transit	75	3.5	262.5	606.5
		Town Upkeep	64	3.5	224	
		Education	40	3	120	
University	Cost	Tuition	50	3	150	695
		Investment	80	4	320	
		Sponsor	75	3	225	
	Image	Humanitarian	62	3.5	217	791.25
		Cutting Edge	57	2.5	142.5	
		Green	42	4	168	
	Sustainability	Renewability	50	5.5	275	681.25
		Efficiency	60	4.5	270	
Student	Group Dynamics	Diversity	85	4.5	382.5	850
		Organization	85	5.5	467.5	
	Community Involvement	Gov/People	70	4.5	315	737.5
		Non-WPI Interaction	50	5.5	275	
	Skill Development + Presence	Educational Value	58	5	290	810
		Qual + Quant of Data	50	5	250	
Project Title:	Enhancing Boating Docks			Total Score:	5426	6633

Figure 7.2

7.3. Housing and Building Space Issues

Main Categories	Sub Categories	Weighted Items	Score	Weight	Total	Weighed Totals
Site	Current Events	Business	85	2.5	212.5	726.25
		Education	57	2	114	
		Government	63	1.5	94.5	
		Enviornment	40	4	160	
	Longetivity	Amount of Content	70	2	140	810
		Enables other Projects	50	4	200	
		Expandable	50	4	200	
	Community Development	Transit	51	3.5	178.5	531.5
		Town Upkeep	64	3.5	224	
		Education	43	3	129	
University	Cost	Tuition	50	3	150	695
		Investment	80	4	320	
		Sponsor	75	3	225	
	Image	Humanitarian	62	3.5	217	791.25
		Cutting Edge	57	2.5	142.5	
		Green	42	4	168	
	Sustainability	Renewability	50	5.5	275	681.25
		Efficiency	60	4.5	270	
Student	Group Dynamics	Diversity	85	4.5	382.5	850
		Organization	85	5.5	467.5	
	Community Involvement	Gov/People	70	4.5	315	737.5
		Non-WPI Interaction	50	5.5	275	
	Skill Development + Presence	Educational Value	58	5	290	810
		Qual + Quant of Data	50	5	250	
Project Title:	Building Space Issues			Total Score:	5400	6632.75

Figure 7.3

7.4. Light Pollution

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	45	2.5	112.5	810
		Education	50	2	100	
		Government	77	1.5	115.5	
		Enviornment	80	4	320	
	Longetivity	Amount of Content	50	2	100	810
		Enables other Projects	55	4	220	
		Expandable	55	4	220	
	Community Development	Transit	20	3.5	70	472.5
		Town Upkeep	85	3.5	297.5	
		Education	35	3	105	
University	Cost	Tuition	50	3	150	670
		Investment	70	4	280	
		Sponsor	80	3	240	
	Image	Humanitarian	55	3.5	192.5	1158.75
		Cutting Edge	88	2.5	220	
		Green	90	4	360	
	Sustainability	Renewability	78	5.5	429	1070.625
		Efficiency	95	4.5	427.5	
Student	Group Dynamics	Diversity	90	4.5	405	812
		Organization	74	5.5	407	
	Community Involvement	Gov/People	95	4.5	427.5	1050
		Non-WPI Interaction	75	5.5	412.5	
	Skill Development + Presence	Educational Value	75	5	375	1125
		Qual + Quant of Data	75	5	375	
Project Title:	Light Pollution			Total Score:	6362	7978.875

Figure 7.4

7.5. Long-term Environmentl Observations in Acadia

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	38	2.5	95	908.75
		Education	80	2	160	
		Government	48	1.5	72	
		Enviornment	100	4	400	
	Longetivity	Amount of Content	95	2	190	1365
		Enables other Projects	90	4	360	
		Expandable	90	4	360	
	Community Development	Transit	20	3.5	70	391.5
		Town Upkeep	37	3.5	129.5	
		Education	64	3	192	
University	Cost	Tuition	57	3	171	731
		Investment	80	4	320	
		Sponsor	80	3	240	
	Image	Humanitarian	50	3.5	175	894
		Cutting Edge	50	2.5	125	
		Green	74	4	296	
	Sustainability	Renewability	50	5.5	275	625
		Efficiency	50	4.5	225	
Student	Group Dynamics	Diversity	90	4.5	405	845
		Organization	80	5.5	440	
	Community Involvement	Gov/People	72	4.5	324	817.5
		Non-WPI Interaction	60	5.5	330	
	Skill Development + Presence	Educational Value	76	5	380	1245
		Qual + Quant of Data	90	5	450	
Project Title:	Observations of Acadia			Total Score:	6185	7822.75

Figure 7.5

7.6. Merging Technology with Local Libraries and Museums

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	65	2.5	162.5	712.5
		Education	75	2	150	
		Government	65	1.5	97.5	
		Enviornment	40	4	160	
	Longetivity	Amount of Content	70	2	140	1080
		Enables other Projects	70	4	280	
		Expandable	75	4	300	
	Community Development	Transit	30	3.5	105	590
		Town Upkeep	70	3.5	245	
		Education	80	3	240	
University	Cost	Tuition	50	3	150	686
		Investment	80	4	320	
		Sponsor	72	3	216	
	Image	Humanitarian	70	3.5	245	960
		Cutting Edge	78	2.5	195	
		Green	50	4	200	
	Sustainability	Renewability	50	5.5	275	737.5
		Efficiency	70	4.5	315	
Student	Group Dynamics	Diversity	35	4.5	157.5	625
		Organization	85	5.5	467.5	
	Community Involvement	Gov/People	80	4.5	360	1000
		Non-WPI Interaction	80	5.5	440	
	Skill Development + Presence	Educational Value	50	5	250	1050
		Qual + Quant of Data	90	5	450	
Project Title:	Updating Libraries and Museums			Total Score:	5921	7441

Figure 7.6

7.7. Shoreline Quality Due to Boating Traffic

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	70	2.5	175	928.125
		Education	65	2	130	
		Government	65	1.5	97.5	
		Enviornment	85	4	340	
	Longetivity	Amount of Content	80	2	160	1080
		Enables other Projects	60	4	240	
		Expandable	80	4	320	
	Community Development	Transit	75	3.5	262.5	707.5
		Town Upkeep	80	3.5	280	
		Education	55	3	165	
University	Cost	Tuition	55	3	165	710
		Investment	80	4	320	
		Sponsor	75	3	225	
	Image	Humanitarian	50	3.5	175	918.75
		Cutting Edge	55	2.5	137.5	
		Green	75	4	300	
	Sustainability	Renewability	55	5.5	302.5	715.625
		Efficiency	60	4.5	270	
Student	Group Dynamics	Diversity	65	4.5	292.5	677.5
		Organization	70	5.5	385	
	Community Involvement	Gov/People	65	4.5	292.5	791.875
		Non-WPI Interaction	62	5.5	341	
	Skill Development + Presence	Educational Value	65	5	325	1012.5
		Qual + Quant of Data	70	5	350	
Project Title:	Shoreline Quality			Total Score:	6051	7541.875

Figure 7.7

7.8. Sound Design Continued

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	20	2.5	50	615.625
		Education	85	2	170	
		Government	75	1.5	112.5	
		Enviornment	40	4	160	
	Longetivity	Amount of Content	90	2	180	1380
		Enables other Projects	95	4	380	
		Expandable	90	4	360	
	Community Development	Transit	35	3.5	122.5	407.5
		Town Upkeep	30	3.5	105	
		Education	60	3	180	
University	Cost	Tuition	55	3	165	565
		Investment	40	4	160	
		Sponsor	80	3	240	
	Image	Humanitarian	75	3.5	262.5	1031.25
		Cutting Edge	90	2.5	225	
		Green	50	4	200	
	Sustainability	Renewability	55	5.5	302.5	800
		Efficiency	75	4.5	337.5	
Student	Group Dynamics	Diversity	30	4.5	135	602.5
		Organization	85	5.5	467.5	
	Community Involvement	Gov/People	75	4.5	337.5	765.625
		Non-WPI Interaction	50	5.5	275	
	Skill Development + Presence	Educational Value	90	5	450	1350
		Qual + Quant of Data	90	5	450	
Project Title:	Sound Design Continued			Total Score:	5828	7517.5

Figure 7.8

7.9. Storm Drain Upgrades

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	83	2.5	207.5	929.375
		Education	63	2	126	
		Government	84	1.5	126	
		Enviornment	71	4	284	
	Longetivity	Amount of Content	80	2	160	936
		Enables other Projects	58	4	232	
		Expandable	58	4	232	
	Community Development	Transit	56	3.5	196	574.5
		Town Upkeep	85	3.5	297.5	
		Education	27	3	81	
University	Cost	Tuition	50	3	150	638
		Investment	62	4	248	
		Sponsor	80	3	240	
	Image	Humanitarian	36	3.5	126	864
		Cutting Edge	60	2.5	150	
		Green	75	4	300	
	Sustainability	Renewability	50	5.5	275	664.375
		Efficiency	57	4.5	256.5	
Student	Group Dynamics	Diversity	46	4.5	207	630.5
		Organization	77	5.5	423.5	
	Community Involvement	Gov/People	95	4.5	427.5	1077.5
		Non-WPI Interaction	79	5.5	434.5	
	Skill Development + Presence	Educational Value	84	5	420	1117.5
		Qual + Quant of Data	65	5	325	
Project Title:	Storm Drain Upgrades			Total Score:	5925	7431.75

Figure 7.9

7.10. Traffic and Parking Issues

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	79	2.5	197.5	765
		Education	60	2	120	
		Government	63	1.5	94.5	
		Enviornment	50	4	200	
	Longetivity	Amount of Content	50	2	100	810
		Enables other Projects	60	4	240	
		Expandable	50	4	200	
	Community Development	Transit	93	3.5	325.5	733.5
		Town Upkeep	78	3.5	273	
		Education	45	3	135	
University	Cost	Tuition	50	3	150	710
		Investment	80	4	320	
		Sponsor	80	3	240	
	Image	Humanitarian	45	3.5	157.5	771.75
		Cutting Edge	50	2.5	125	
		Green	58	4	232	
	Sustainability	Renewability	50	5.5	275	715
		Efficiency	66	4.5	297	
Student	Group Dynamics	Diversity	90	4.5	405	817.5
		Organization	75	5.5	412.5	
	Community Involvement	Gov/People	80	4.5	360	848.75
		Non-WPI Interaction	58	5.5	319	
	Skill Development + Presence	Educational Value	62	5	310	840
		Qual + Quant of Data	50	5	250	
Project Title:	Traffic and Parking Issues			Total Score:	5739	7011.5

Figure 7.10

7.11. Trail View Continued

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	70	2.5	175	1000
		Education	80	2	160	
		Government	70	1.5	105	
		Enviornment	90	4	360	
	Longetivity	Amount of Content	95	2	190	1335
		Enables other Projects	90	4	360	
		Expandable	85	4	340	
	Community Development	Transit	70	3.5	245	712.5
		Town Upkeep	65	3.5	227.5	
		Education	80	3	240	
University	Cost	Tuition	50	3	150	650
		Investment	65	4	260	
		Sponsor	80	3	240	
	Image	Humanitarian	70	3.5	245	1166.25
		Cutting Edge	85	2.5	212.5	
		Green	80	4	320	
	Sustainability	Renewability	75	5.5	412.5	937.5
		Efficiency	75	4.5	337.5	
Student	Group Dynamics	Diversity	85	4.5	382.5	850
		Organization	85	5.5	467.5	
	Community Involvement	Gov/People	80	4.5	360	1000
		Non-WPI Interaction	80	5.5	440	
	Skill Development + Presence	Educational Value	85	5	425	1350
		Qual + Quant of Data	95	5	475	
Project Title:	Trail View Continued			Total Score:	7130	9001.25

Figure 7.11

7.12. Water Quality Due to Boating Traffic

Main Categories	Sub Categories	Weighted Items	Score	**Weight**	Total	Weighed Totals
Site	Current Events	Business	75	2.5	187.5	975
		Education	60	2	120	
		Government	75	1.5	112.5	
		Enviornment	90	4	360	
	Longetivity	Amount of Content	55	2	110	975
		Enables other Projects	65	4	260	
		Expandable	70	4	280	
	Community Dev	Transit	80	3.5	280	740
		Town Upkeep	80	3.5	280	
		Education	60	3	180	
University	Cost	Tuition	60	3	180	615
		Investment	60	4	240	
		Sponsor	65	3	195	
	Image	Humanitarian	70	3.5	245	1110
		Cutting Edge	62	2.5	155	
		Green	85	4	340	
	Sustainability	Renewability	75	5.5	412.5	937.5
		Efficiency	75	4.5	337.5	
Student	Group Dynamics	Diversity	70	4.5	315	727.5
		Organization	75	5.5	412.5	
	Community Involvement	Gov/People	80	4.5	360	1013.75
		Non-WPI Interaction	82	5.5	451	
	Skill Development + Presence	Educational Value	50	5	250	900
		Qual + Quant of Data	70	5	350	
Project Title:	Water Quality			Total Score:	6414	7993.75

Figure 7.12

8. Appendix B – Housing Forms

8.1. College of the Atlantic, 105 Eden Street, Bar Harbor, ME

Address	College of the Atlantic, 105 Eden Street, Bar Harbor, ME		
Criteria	Units	Value	Score
Type	Apt./House/bldg?	dormitory	
Security	Crime index	1	100
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Mildly Quiet	75
Furniture	Fully/Partial/None	Fully	100
Plumbing Type	Sewer/Septic	Sewer	
Plumbing Quality	0-10	7	70
Bathrooms	No. of bathrooms	2	
Utilities	Yes/No	Yes	100
Total Space	ft^2	1300 ft^2	58
Max legal occupants	No. of people	10	
Bedrooms	No. of bedrooms	4	
Location	Miles	0.9 mi	91
Internet Access	Mb/s (shared)	88 Mb/s	100
Parking	No. of parking spots	10	
Rent (Total)	$ per week	$2,000	86
Rent (Individual)	$ per person per week	$200	
Cost	$ total		
Taxes	$		
Total	Scaled Value	694	

Figure 8.1

8.2. Schoodic Education and Research Center, Schoodic Point, Winter Harbor, ME 04693

Criteria	Units	Value	Score
Type	Apt./House/bldg?	dormitory	
Security	Crime index	1	100
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Quiet	100
Furniture	Fully/Partial/None	Fully	100
Plumbing Type	Sewer/Septic	Sewer	
Plumbing Quality	0-10	10	100
Bathrooms	No. of bathrooms	4	
Utilities	Yes/No	Yes	100
Total Space	ft^2	1800 ft^2	45
Max legal occupants	No. of people	20	
Bedrooms	No. of bedrooms	5	
Location	Miles	46.8 mi	1
Internet Access	Mb/s (shared)	50 Mb/s	81
Parking	No. of parking spots	20	
Rent (Total)	$ per week	$6,000	74
Rent (Individual)	$ per person per week	$300	
Cost	$ total		
Taxes	$		
Total	Scaled Value	627	

Figure 8.2

8.3. 71 Eagle Lake Rd, Bar Harbor, ME

Address	71 Eagle Lake Rd, Bar Harbor, ME 04609		
Criteria	Units	Value	Score
Type	Apt./House/bldg?	house	
Security	Crime index	1	100
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Mild	100
Furniture	Fully/Partial/None	None	0
Plumbing Type	Sewer/Septic	Sewer	
Plumbing Quality	0-10	10	100
Bathrooms	No. of bathrooms	3	
Utilities	Yes/No	No	0
Total Space	ft^2	2752 ft^2	78
Max legal occupants	No. of people	12	
Bedrooms	No. of bedrooms	4	
Location	Miles	3.5 mi	70
Internet Access	Mb/s (shared)	50 Mb/s	94
Parking	No. of parking spots	6	
Rent (Total)	$ per week		
Rent (Individual)	$ per person per week		
Cost	$ total	$350,000	78
Taxes	$	$3,594	
Total	Scaled Value	543	

Figure 8.3

8.4. 6 Prospect Ave, Bar Harbor, ME

Address	6 Prospect Ave, Bar Harbor, ME 04609		
Criteria	Units	Value	Score
Type	Apt./House/bldg?	commercial	
Security	Crime index	2	90
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Noisy	10
Furniture	Fully/Partial/None	Partial	50
Plumbing Type	Sewer/Septic	Sewer	
Plumbing Quality	0-10	10	100
Bathrooms	No. of bathrooms		
Utilities	Yes/No	Yes	100
Total Space	ft^2	4290 ft^2	74
Max legal occupants	No. of people	21	
Bedrooms	No. of bedrooms	7	
Location	Miles	3.5 mi	70
Internet Access	Mb/s (shared)	50 Mb/s	80
Parking	No. of parking spots	24	
Rent (Total)	$ per week		100
Rent (Individual)	$ per person per week	$0	
Cost	$ total	$650,000	50
Taxes	$	$5,854	
Total	Scaled Value	575	

Figure 8.4

8.5. 108 West Street, Bar Harbor, ME 04609

Address	108 West Street, Bar Harbor, ME 04609		
Criteria	Units	Value	Score
Type	Apt./House/bldg?	apartment	
Security	Crime index	2	90
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Noisy	10
Furniture	Fully/Partial/None	Partial	50
Plumbing Type	Sewer/Septic	Sewer	
Plumbing Quality	0-10	10	100
Bathrooms	No. of bathrooms	6	
Utilities	Yes/No	Yes	100
Total Space	ft^2	3355 ft^2	66
Max legal occupants	No. of people	21	
Bedrooms	No. of bedrooms	7	
Location	Miles	0.5 mi	95
Internet Access	Mb/s (shared)	50 Mb/s	80
Parking	No. of parking spots	10	
Rent (Total)	$ per week		100
Rent (Individual)	$ per person per week		
Cost	$ total	$585,000	55
Taxes	$	$6,019	
Total	Scaled Value	591	

Figure 8.5

8.6. 760 Norway Drive, Bar Harbor, ME 04609.

Address	760 Norway Drive, Bar Harbor, ME 04609		
Criteria	Units	Value	Score
Type	Apt./House/bldg?	house	
Security	Crime index	1	100
Noise	Quiet/Mildly Quiet/Moderate/Mildly Noisy/Noisy	Quiet	100
Furniture	Fully/Partial/None	None	0
Plumbing Type	Sewer/Septic	Septic	
Plumbing Quality	0-10	10	100
Bathrooms	No. of bathrooms	3	
Utilities	Yes/No	Yes	100
Total Space	ft^2	2484 ft^2	75
Max legal occupants	No. of people	12	
Bedrooms	No. of bedrooms	4	
Location	Miles	4.8 mi	62
Internet Access	Mb/s (shared)	50 Mb/s	94
Parking	No. of parking spots	10	
Rent (Total)	$ per week		100
Rent (Individual)	$ per person per week		
Cost	$ total	$350,000	78
Taxes	$	$3,324	
Total	Scaled Value	631	

Figure 8.6

9. Appendix C – Sponsor Forms

9.1. Abbe Museum

Name of Company	Type Name	Abbe Museum
Size of Organization	Number of Employees	20
Type of Organization	Write Type	historical preservation and education
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	Yes
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	Yes
Environmental	Yes/No	Yes
Cultural	Yes/No	Yes
Social	Yes/No	No

Figure 9.1

9.2. Acadia Senior College

Name of Company	Type Name	Acadia Senior College
Size of Organization	Number of Employees	1 (See further Information)
Type of Organization	Write Type	higher education
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	Yes
Workspace	Yes/No	No
Interested in Sponsoring a Project	Yes/No	No
Noted Interests		
Educational	Yes/No	No
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.2

9.3. *Bar Harbor BioTechnology*

Name of Company	Type Name	Bar Harbor BioTechnology
Size of Organization	Number of Employees	11-50
Type of Organization	Write Type	developing innovative molecular biology products and services that advance life science research and
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	No
Workspace	Yes/No	No
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	No
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.3

9.4. *College of the Atlantic*

Name of Company	Type Name	College of the Atlantic
Size of Organization	Number of Employees	44
Type of Organization	Write Type	higher education
History of Sponsorship	Yes/No	Yes
Non-Profit	Yes/No	No
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	No
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.4

9.5. *Friends of Acadia*

Name of Company	Type Name	Friends of Acadia
Size of Organization	Number of Employees	3000
Type of Organization	Write Type	protection of Acadia National Park
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	Yes
Workspace	Yes/No	No
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	No
Environmental	Yes/No	Yes
Cultural	Yes/No	Yes
Social	Yes/No	Yes

Figure 9.5

9.6. *The Jackson Laboratory*

Name of Company	Type Name	The Jackson Laboratory
Size of Organization	Number of Employees	1400
Type of Organization	Write Type	mammalian genetics research to advance human health
History of Sponsorship	Yes/No	Yes
Non-Profit	Yes/No	Yes
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	No
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.6

9.7. *Jesup Memorial Library*

Name of Company	Type Name	Jesup Memorial Library
Size of Organization	Number of Employees	6
Type of Organization	Write Type	information preservation
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	Yes
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	Yes
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.7

9.8. *Maine Island Trail Association*

Name of Company	Type Name	Maine Island Trail Association
Size of Organization	Number of Employees	25
Type of Organization	Write Type	water trail construction and coastline preservation
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	Yes
Workspace	Yes/No	No
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	Yes
Environmental	Yes/No	Yes
Cultural	Yes/No	Yes
Social	Yes/No	No

Figure 9.8

9.9. *Mount Desert Island Laboratories*

Name of Company	Type Name	Mount Desert Island Biological Laboratory
Size of Organization	Number of Employees	45
Type of Organization	Write Type	marine and biomedical research
History of Sponsorship	Yes/No	Yes
Non-Profit	Yes/No	Yes
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	No
Environmental	Yes/No	No
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.9

9.10. *MERI Center for Marine Studies*

Name of Company	Type Name	MERI Center for Marine Studies
Size of Organization	Number of Employees	18
Type of Organization	Write Type	marine education and research to help protect marine life
History of Sponsorship	Yes/No	No
Non-Profit	Yes/No	Yes
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	No
Potential Project Types		No
Educational	Yes/No	Yes
Environmental	Yes/No	Yes
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.10

9.11. Schoodic Education and Research Center

Name of Company	Type Name	Schoodic Education and Research Center
Size of Organization	Number of Employees	32
Type of Organization	Write Type	research and education with Acadia National Park
History of Sponsorship	Yes/No	Yes
Non-Profit	Yes/No	Yes
Workspace	Yes/No	Yes
Interested in Sponsoring a Project	Yes/No	Yes
Noted Interests		
Educational	Yes/No	Yes
Environmental	Yes/No	Yes
Cultural	Yes/No	No
Social	Yes/No	No

Figure 9.11